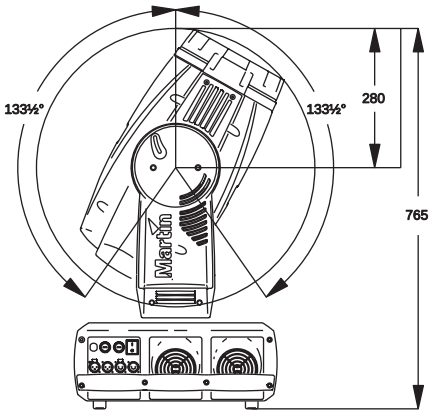
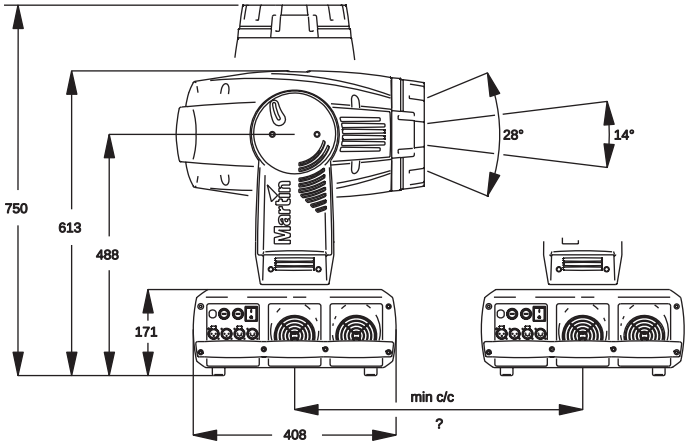
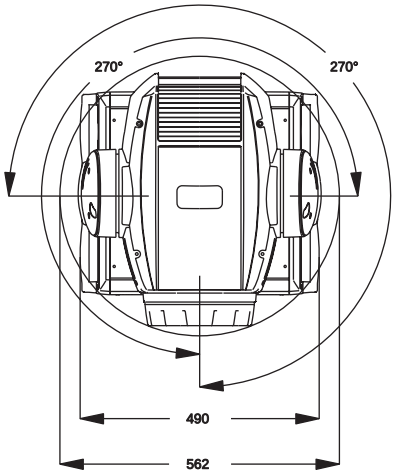
MAC 2000 Wash XB™

user manual

Dimensions







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Notes

Safety Information

WARNING!
Read the safety precautions in this section before installing, powering, operating or servicing this product.

The following symbols are used to identify important safety information on the product and in this manual:

Warning! Safety hazard. Risk of severe injury or death.

Warning! Refer to manual before installing, powering or servicing.

Warning! Hazardous voltage. Risk of lethal or severe electric shock.

Warning! Fire hazard.

Warning! Burn hazard. Hot surface. Do not touch.

Warning! Risk of eye injury. Safety glasses must be worn.

Warning! Risk of hand injury. Safety gloves must be worn.

This product is for professional use only. It is not for household use.

This product presents risks of severe injury or death due to fire and burn hazards, electric shock, lamp explosion and falls.

Read this manual before installing, powering or servicing the fixture, follow the safety precautions listed below and observe all warnings in this manual and printed on the fixture. If you have questions about how to operate the fixture safely, please contact your Martin supplier or call the Martin 24-hour service hotline on +45 8740 0000, or in the USA on 1-888-tech-180.

PROTECTION FROM ELECTRIC SHOCK

- Disconnect the fixture from AC power before removing or installing any cover or part – including the lamp and fuses – and when not in use.
- Always ground (earth) the fixture electrically.
- Use only a source of AC power that complies with local building and electrical codes and has both overload and ground-fault (earth-fault) protection.
- Connect this fixture to AC power either using the supplied power cable or via 3-conductor cable that is rated minimum 16 amp, extra hard usage. Suitable cable types include ST, STW, SEO, SEOW and STO.
- Before using the fixture, check that all power distribution equipment and cables are in perfect condition and rated for the current requirements of all connected devices.
- Do not use the fixture if the power cable or power plug are in any way damaged, defective or wet, or if they show signs of overheating.
- Do not expose the fixture to rain or moisture.
- Refer any service operation not described in this manual to a qualified technician.

LAMP SAFETY

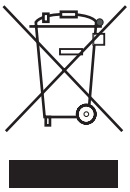
- Prolonged exposure to an unshielded discharge lamp can cause eye and skin burns. Do not stare directly into the light output. Never look at an exposed lamp while it is lit.
- Do not operate the fixture with missing or damaged covers, shields, lenses or ultraviolet screens.
- A hot discharge lamp is under pressure and can explode without warning. Allow the fixture to cool for at least 45 minutes and protect yourself with safety glasses and gloves before handling a lamp or servicing the fixture internals.
- Replace the lamp immediately if it becomes visually deformed, damaged or in any way defective
- Monitor hours of lamp use and lamp intensity and replace the lamp when it reaches the limit of its service life as specified in this manual or by the lamp manufacturer.
- Install only an approved lamp.
- If the quartz envelope of a discharge lamp is broken, the lamp releases a small quantity of mercury and other toxic gases. If a discharge lamp explodes in a confined area, evacuate the area and ventilate it thoroughly. Wear nitrite gloves when handling a broken discharge lamp. Treat broken or used discharge lamps as hazardous waste and send to a specialist for disposal.

PROTECTION FROM BURNS AND FIRE

- The exterior of the fixture becomes very hot – up to 175° C (347° F) – during use. Avoid contact by persons and materials. Allow the fixture to cool for at least 45 minutes before handling.
- Never attempt to bypass the thermostatic switch or fuses. Always replace defective fuses with ones of the specified type and rating.
- Keep all combustible materials (e.g. fabric, wood, paper) at least 1 m (39 in.) away from the fixture. Keep flammable materials well away from the fixture.
- Do not illuminate surfaces within 3 m (10 ft.) of the fixture.
- Provide a minimum clearance of 0.1 m (4 in.) around fans and air vents.
- Never stick filters, masks or other materials onto any lens or other optical component.
- Do not modify the fixture or install other than genuine Martin parts.
- Do not operate the fixture if the ambient temperature (Ta) exceeds 40° C (104° F).

PROTECTION FROM INJURY DUE TO FALLS

- Do not lift or carry the fixture alone.
- Use two evenly spaced clamps to suspend the fixture from rigging structures. Do not use only one clamp.
- When suspending the fixture, ensure that the structure and all hardware used can hold at least 10 times the weight of all devices suspended from them.
- Use a secondary attachment such as a safety cable that is approved for the weight of the fixture and installed as described in this manual.
- Check that all external covers and rigging hardware are securely fastened.
- Block access below the work area and work from a stable platform whenever installing, servicing or moving the fixture.



Disposing of this product

Martin™ products are supplied in compliance with Directive 2002/96/EC of the European Parliament and of the Council of the European Union on WEEE (Waste Electrical and Electronic Equipment), as amended by Directive 2003/108/EC, where applicable.

Help preserve the environment! Ensure that this product is recycled at the end of its life. Your supplier can give details of local arrangements for the disposal of Martin products.

Introduction

Thank you for selecting the MAC 2000 Wash XB™ from Martin™.

The MAC 2000 Wash XB is a 1500 watt moving head wash light that provides CMY color mixing, color correction (CTC), two color wheels (each with four removable colors), a combined dimmer/shutter. 540° of pan and 267° of tilt. A motorized barndoor system and optional dimmer wheel are available as separately orderable accessories.

The MAC 2000 Wash XB is supplied with a Fresnel lens that gives a medium beam angle installed. A PC lens that gives a narrow angle and a super wide lens that gives a very wide angle are also supplied with the fixture. A motorized zoom provides 1/10 peak angle ranges of 12.5° through to 39° (in the standard Fresnel configuration), 12.5° through to 35° (with the PC lens fitted), or 73° through to 91° (with the multi-array super wide-angle lens fitted).

The MAC 2000 Wash XB is fitted with an electronic ballast that provides flicker-free operation and an economical power-saving mode. The switch mode power supply unit is auto ranging to match 200 - 240 V nominal AC power. It adapts automatically to 50 or 60 Hz power.

Comments or suggestions regarding this user manual may be e-mailed to service@martin.dk or posted to:

Service Department
Martin Professional A/S
Olof Palmes Allé 18
DK-8200 Aarhus N
Denmark

For the latest software updates, documentation, and other information about this and all Martin Professional products, please visit the Martin website at http://www.martin.com. If you require technical support and the material at www.martin.com/service does not help, contact your local distributor (details at www.martin.com/distributors). Support is also available on the Martin 24-hour hotline at +45 8740 0000, or in the USA at 1-888-tech-180.

Warning! Read the safety precautions in this manual before installing and operating the fixture.

Transportation

Important!Release the transport locks before operating the fixture.

Included items

The MAC 2000 Wash XB is shipped in a cardboard box or in a 1 or 2 unit flight case that contains the following items.

- This user manual
- Osram HTI 1500 W/D7/60 SharXS lamp (installed)
- Two Omega clamp attachment brackets, 1/4-turn
- PC lens
- Fresnel lens (installed)
- Super wide-angle (multi-array) lens
- 2 x 15 A main fuses

30 mm (1.2 in.), 40 mm (1.6 in.) and 45 mm (1.8 in.) aperture rings are included inside the fixture and a 50 mm (2 in.) aperture ring is installed as standard.

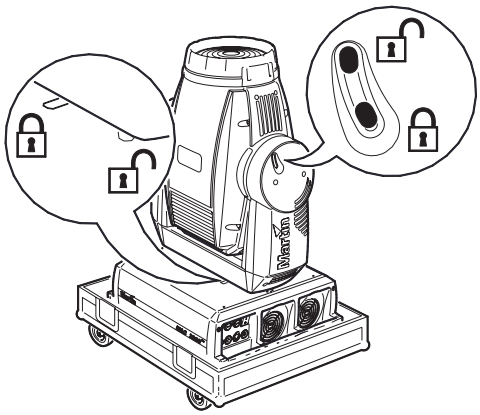


Figure 1: Pan and tilt locks

Transport locks

The head and yoke may be locked for transportation and service. The locks are shown in Figure 1. The fixture must be unlocked before operation.

Cardboard box

Instructions for removing models that have been shipped in a cardboard box are printed on the outside of the box. The cardboard box is not designed for repeated use and for transportation of the fixture we strongly recommend the use of one of our flight cases.

Single flight case

Unpacking the fixture

1 Remove the top of the flight case.

2 With one person on each side, lift the fixture out of the bottom of the flight case.

3 Release the pan and tilt locks before operating.

Packing the fixture

1 Disconnect the fixture from power and allow it to cool.

2 Lock the head and yoke in the position shown in Figure 2.

3 Place the fixture in the bottom of the flight case. Place the top section over the fixture without forcing.

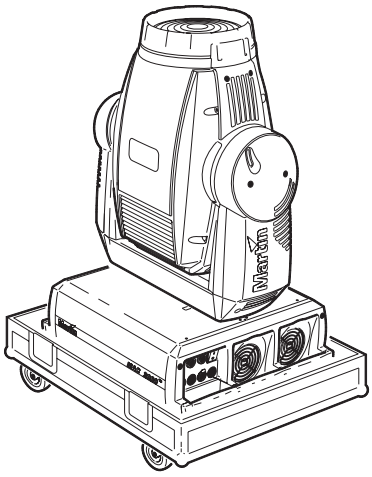


Figure 2: Single unit transport position

Double flight case

Unpacking

1 Open the flight case and pull the drawer all the way out.

2 Release the head (tilt) transport lock.

3 Install rigging hardware as described on page 12.

4 With one person on each side, lift the fixture out of the flight case.

Packing

1 Disconnect the fixture from power and allow it to cool.

2 Turn the yoke parallel to the sides of the base with the tilt lock closest to the back of the base.

3 Pull the transport drawer all the way out. With one person on each side, place the fixture on the drawer with the 'Front' arrow pointing into the flight case.

4 Remove and stow rigging hardware. Coil and stow the power cable in the door.

5 Tilt the head so that the lens points away from the door as shown in Figure 3. Lock the head in the horizontal position. Do not lock the yoke.

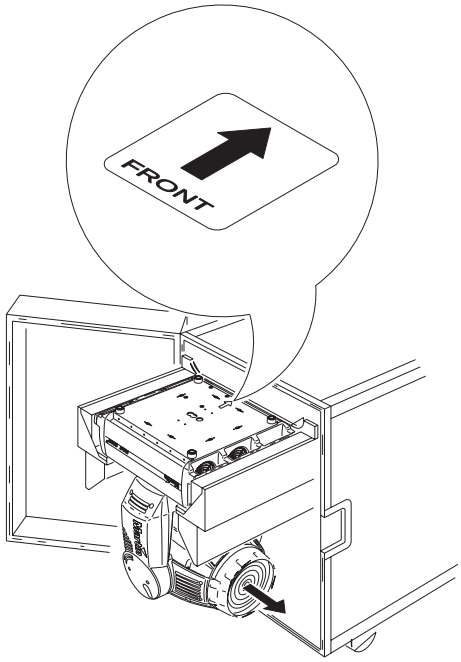


Figure 3: Double unit transport position

6 Slide the drawer all the way in without forcing. Close the flight case.

Setup for flight case testing

The double flight case has two slide-out arms from which the fixture can hang for testing and setting. Though unnecessary, the pan and tilt reset can be cancelled by pressing [Menu] and [Enter] at the same time.

1 Open the flight case and pull the drawer all the way out. Release the transport locks.

2 Pull the test arms out. Tilt the fixture up and over the test arms so that the handle cross-braces that are second from the back rest on the arms. The fixture should rest at an angle.

3 Push the transport drawer into the flight case.

AC power

Warning! For protection from electric shock, the MAC 2000 Wash XB must be grounded (earthed). The AC power supply must have both current overload and ground fault (earth leakage) protection.

Do not connect the MAC 2000 Wash XB to power that is outside the voltage range specified in this manual and marked on the product.

Power supply

The MAC 2000 Wash XB can be operated on 200 - 240 V nominal AC power. It has an auto-ranging power supply that adjusts automatically to match AC voltage within this range and to match 50 or 60 Hz power.

Fuses

The MAC 2000 Wash XB is supplied with two 15 A main fuses installed in the fuseholders near the power switch.

Power connection

Important! Connect the MAC 2000 Wash XB directly to AC power. Do not connect it to a dimmer system; doing so may damage the fixture.

You may need to install a power plug that is suitable for your region on the power cable. A 3-prong grounding-type plug must be installed following the plug manufacturer's instructions. The table below shows some possible pin identification schemes; if the pins are not clearly identified, or if you have any doubts about proper installation, consult a qualified electrician.

Wire Color	Pin	Symbol	Screw (US)
brown	live	L	yellow or brass
blue	neutral	N	silver
yellow/green	ground	⏚ or ⏚	green

Table 1: Power plug connections

To apply power, set the power switch on the base to the "**I**" position.

Reduced power function

The MAC 2000 Wash XB has an automatic power reduction function that reduces power to the lamp to 1200 W if the shutter/dimmer is closed for more than 10 seconds. This feature gives more efficient use of power, reduces heat and reduces the overall noise emission of the fixture.

Data

Important!Do not connect more than 1 data input and 1 data output at any one time.

The MAC 2000 Wash XB has both 3-pin and 5-pin XLR sockets for DMX input and output. The pin-out on all sockets is pin 1 to shield, pin 2 to cold (-), and pin 3 to hot (+). There is no connection to pins 4 and 5.

The sockets are wired in parallel: both inputs connect to both outputs. For reliable data transmission and to avoid damage to the fixture, use only one input and one output at any one time!

Connecting fixtures

- Use shielded twisted-pair cable designed for RS-485 devices: standard microphone cable cannot transmit control data reliably over long runs. 24 AWG cable is suitable for runs up to 300 meters (1000 ft). Heavier gauge cable and/or an amplifier is recommended for longer runs.
- Never use both outputs to split the link. To split the serial link into branches use a splitter such as the Martin 4-Channel Opto-Isolated RS-485 Splitter/Amplifier.
- Do not overload the link. Up to 32 devices may be connected on a serial link.
- Terminate the link by installing a termination plug in the output socket of the last fixture. The termination plug, which is a male XLR plug with a 120 Ohm, 0.25 Watt resistor soldered between pins 2 and 3, “soaks up” the control signal so it does not reflect and cause interference. If a splitter is used, terminate each branch of the link.

Connecting the data link

1 Connect the DMX data cable from the controller to the MAC 2000 Wash XB’s 3-pin or 5-pin input (male) socket.

2 Using the sockets that match your data cable, connect the output of the fixture closest to the controller to the input of the next fixture.

3 Insert a male DMX termination plug (*see “Accessories” on page 49*) in one of the XLR outputs of the last fixture on the link.

Rigging

The MAC 2000 Wash XB can be placed on stage or clamped to a truss in any orientation. The Fast-Lock system enables quick and easy fastening of the clamp brackets in 4 positions as shown Figure 4.

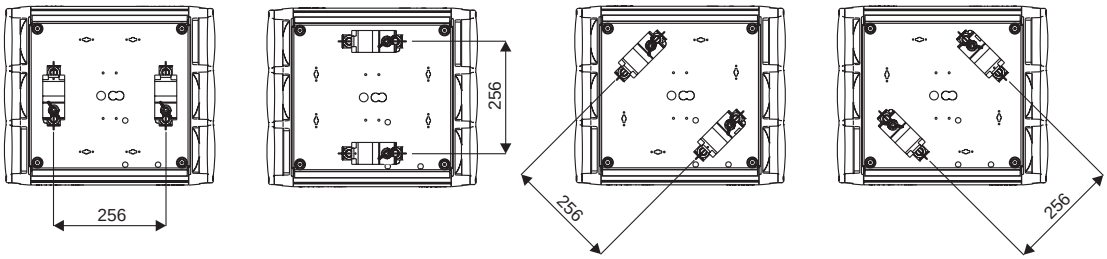


Figure 4: Clamp bracket positions

Warning! Always use 2 clamps to rig the fixture. Lock each clamp with both 1/4-turn fasteners. The fasteners are locked only when turned fully clockwise.

Warning! Attach an approved safety cable to the attachment hole in the base. Never use the carrying handles for secondary attachment.

Clamping the fixture to a truss

1 Verify that the rigging clamps (not included) are undamaged and can bear at least 10 times the weight of the fixture. Verify that the structure can bear at least 10 times the weight of all installed fixtures, clamps, cables, auxiliary equipment, etc.

2 Bolt each clamp securely to a clamp bracket with an M12 bolt (grade 8.8 or better) and lock nut.

3 Align a clamp with 2 mounting points in the base. Insert the fasteners into the base and turn both levers a full 1/4-turn clockwise to lock. Install the second clamp.

4 If the truss can be lowered, fixtures can be clamped on directly from the double flight case. If the fixture must be lifted, block access under the work area. Working safely from a stable platform, hang the fixture on the truss with the arrow towards the area to be illuminated. Tighten the rigging clamps.

5 Install a safety wire that can bear at least 10 times the weight of the fixture. The attachment point is designed to fit a caribiner clamp.

6 Verify that the pan and tilt locks are released. Verify that there are no combustible materials within 1 m (39 in.) of the fixture, that there are no flammable materials nearby, and that surfaces to be illuminated are at least 3 m (10 ft.) away.

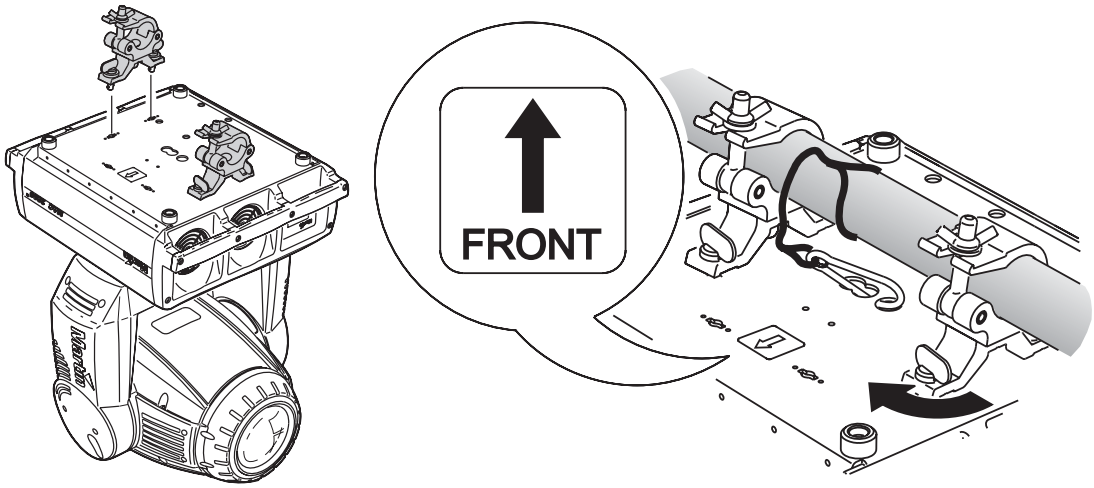


Figure 5: Rigging hardware installation

Control panel

The LED control panel is used to set the address and personalities, read lamp hours and other information, calibrate effects, and run a test routine. Most of these functions may be performed remotely via the serial link with the Martin MP-2 Uploader.

Navigation

The DMX address and any messages (see page 43) are displayed when the MAC 2000 Wash XB is turned on. To enter the menu, press [Menu]. Press [Up] and [Down] to move within the menu. To select a function or submenu, press [Enter]. To escape a function or menu, press [Menu].

See “Control menu” on page 37 for a complete list of the menu items.

Note: [Enter] must be pressed and held for a few seconds to enter the utilities menu.

DMX address and protocol setting

The DMX address, also known as the start channel, is the first channel used to receive instructions from the controller. For independent control, each fixture must be assigned its own control channels. Two MAC 2000 Wash XB fixtures may share the same address, however, if identical behavior is desired. Address sharing can be useful for diagnostic purposes and symmetric control, particularly when combined with the inverse pan and tilt options.

Two DMX protocols, 8-bit and 16-bit, are available. The 8-bit mode uses 19 control channels and provides full basic control. The 16-bit mode uses 2 additional channels to provide finer pan/tilt positioning.

Setting the DMX address and protocol

1 Press [Menu] to enter the main menu.

2 Press [Up] until AddR is displayed. Press [Enter]. To snap to channel 1, press [Enter] and [Up]. Scroll to the desired channel and press [Enter].

3 Select PSET from the main menu and press [Enter]. Select 8bit or 16bt and press [Enter].

Tailoring performance

Movement

The MAC 2000 Wash XB provides six options for optimizing movement for different applications. The:

- Protocol setting (PSET) setting selects 8-bit or finer 16-bit control of pan and tilt.
- Pan and tilt invert (PATI) menu swaps and/or inverts pan and tilt.
- Pan/tilt speed (PTSP) menu provides 3 settings: FAST, NORM, and SLOW.
  NORM is best for most applications. FAST provides better performance in applications where speed is most important. SLOW provides the smoothest movement and is best in long-throw applications with slow movements through narrow angles.
- Studio mode (STUd) setting optimizes all effects besides pan and tilt for speed or quietness.
- Shortcuts (SCUT) setting determines whether the color wheels always take the shortest path between two static positions or oscillate between outer positions.

Tracking Response

The MAC 2000 Wash XB has a filter algorithm that looks at several position updates in tracking control mode and calculates the ideal response for smooth movement. Tracking response is adjustable to compensate for variations in controller performance. In most cases the default settings work well.

If tracking mode movement is not satisfactory there are 2 parameters that can be adjusted. The first is selected under PERS→TRAC→MOdE. The default, MOd 1, is the best choice with controllers that

calculate intermediate positions at a steady rate. Begin by selecting the alternative, MOd2, which is better if the intermediate positions stray significantly from the line of travel.

The second parameter is the number of position updates used to calculate speed. The level is adjustable between 1 and 10 under PERS→TRAC→CAL. Increasing the number of samples increases the distance over which speed is calculated, making movement smoother but less responsive to sudden changes. Experiment for best results.

Display

The display intensity (dINT) setting controls display brightness. The display on/off setting (dISP) determines whether the display remains on or extinguishes two minutes after the last key-press. To flip the display, press [Up] and [Down] simultaneously.

Lamp

There are two settings that modify lamp control: Automatic Lamp On (ALON) and DMX Lamp Off (dLOF).

When ALON is off, the lamp remains off until a “lamp on” command is received from the controller. When ALON is on, the lamp strikes automatically after the fixture is powered on. When ALON is set to DMX, the lamp strikes automatically when the fixture receives DMX data, and it extinguishes 15 minutes after DMX data is lost.

When ALON is set to either ON or DMX, the automatic lamp strike timing is staggered to prevent all lamps from striking at once. The delay is determined by the fixture address.

If striking lamps from the controller, note that striking many lamps at once may cause a voltage drop large enough to prevent lamps from striking or trip the main circuit breaker. Avoid this by programming a “lamp on” sequence that strikes lamps one at a time at 5 second intervals.

Power to the lamp can be turned off from the controller if DMX Lamp Off (dLOF) is on.

Shutter dimming curves

Two dimming curves are available for the mechanical shutter system for adjusting intensity (PERS→dICU). The default, dimmer curve 1, simulates the dimming of a tungsten lamp. Dimmer curve 2 applies a linear algorithm to intensity adjustment, that results in even adjustment across the whole dimming range. Note that this setting has no effect on the optional dimming wheel, that uses a logarithmic dimming curve.

DMX reset

The fixture can be reset from the controller if DMX reset (PERS→dRES) is set to ON.

Custom settings

The custom configuration function allows you to save and recall three sets of fixture settings. The savable settings are DMX mode, pan/tilt speed, pan/tilt inverse and swap, DMX lamp off and reset, display settings, shortcuts, studio mode, automatic lamp on, effects feedback, tracking algorithm, and tracking samples.

Readouts

Note: The MP-2 Uploader provides commands to display the time, temperature, and version readouts on the fixture control panel.

Time

INFO→TIME provides readouts of fixture hours (HRS), lamp hours (L HR), and lamp strikes (L ST). Under each item is a resettable (RSET) increment counter and a non-resettable counter for total accumulated hours/strikes since fabrication (TOTL). To reset an increment counter, display it and then press [Up] until it reads 0. (This may also be done remotely using the MP-2 Uploader.)

Temperature

INFO→TEMP provides readouts of the head and base temperature in Celsius and Fahrenheit.

Software version

INFO→VER displays the version number of the installed software. The software version is also displayed briefly at startup.

DMX

The DMXL menu shows the DMX start code (STCO) and DMX values received for each effect.

Service messages

The Service LED on the control panel lights under conditions that require fixture service, and there is a message describing the service required. To display the message, select SMSG in the main menu. This item is available only when the LED is lit. There are two service messages.

REPLACE LAMP is displayed when the lamp counter exceeds 750 hours, which is the rated average life for the Osram HTI 1500 W/D7/60 lamp. Do not exceed the average life of the lamp by more than 10%.

FIXTURE OVERHEATNG is displayed when the head temperature exceeds safe levels. Overheating is typically caused by trying to operate the fixture in ambient temperatures above 40° C (104° F), dirty air filters, fans, or air vents, or a defective fan.

Service utilities

Important!Enter must be held for several seconds to access the utilities menu.

Test sequences

TSEQ provides a general test of all effects that can be run without a controller. UTIL→PCBL provides routines for circuit board testing that are for service use only.

Feedback toggles

An on-the-fly position correction system monitors the color wheels. If a position error is detected, the shutter closes while the effect resets. This feature can be disabled by turning effects feedback (UTIL→EFFb) off.

The automatic pan/tilt position correction system may be temporarily turned off under UTIL→FEbA. The off setting, however, is not saved and the system will be re-enabled the next time the fixture starts. If the system cannot correct the pan/tilt position within 10 seconds, feedback is automatically disabled.

Adjustment

The adjustment menu (UTIL→AdJ) provides manual control for making mechanical adjustments and is used by Martin service technicians.

Calibration

The calibration menu (UTIL→CAL) provides utilities to define offsets in software that are relative to the mechanical reset or home positions. This allows you to fine tune optical alignment and achieve uniform performance between fixtures. Dimmer and zoom are calibrated to defined points. The other effects are calibrated relative to an arbitrary reference fixture.

Default offset settings may be restored by selecting default offsets (UTIL→dFOF).

Calibrating effects

1 Apply power and strike the lamp.

2 To calibrate the zoom, select UTIL→CAL→ZOOF and press [Enter]. The default value of 128 can be adjusted up or down to move the diffuser lens relatively forward or back. Make any necessary adjustments and press [Enter] to save the setting.

3 To calibrate the color wheels to an offset from their mechanically indexed position, select UTIL→CAL→C 1OF and press [Enter]. The default value of 128 can be adjusted up or down to move the color wheel relatively forward or back from its indexed position. Make any necessary adjustments and press [Enter] to save the setting. Repeat this procedure if necessary for color wheel 2 (C2OF).

4 To calibrate the optional dimmer wheel to an offset from its mechanically indexed position, select UTIL→CAL→DIMW and press [Enter]. The default value of 128 can be adjusted up or down to move the dimmer wheel relatively forward or back from its indexed position. Make any necessary adjustments and press [Enter] to save the setting.

5 Pan calibration is most useful when multiple fixtures are stacked vertically. To calibrate, set zoom, iris, and tilt position for easy one-over-the-other comparison and set each fixture to the same pan DMX value. Select one fixture to be the reference fixture. On the other fixtures, select UTIL→CAL→P OF and press [Enter]. Adjust the offset as necessary to align the beam with the reference beam. Press [Enter] to save the setting.

6 Tilt calibration is most useful when multiple fixtures are arranged horizontally. To calibrate, set zoom, iris, and pan position for easy side-by-side comparison and set each fixture to the same tilt DMX value. Select one fixture to be the reference fixture. On the other fixtures, select UTIL→CAL→T OF and press [Enter]. Adjust the offset as necessary to align the beam with the reference beam. Press [Enter] to save the setting.

7 To calibrate the dimmer, select UTIL→CAL→D OF and press [Enter]. Hold a piece of paper over the lens. Set the offset to 0 and then increase it until light is clearly projected onto the paper. Press [Enter] to save the setting. Remove the paper.

8 To calibrate color mixing flags (cyan, magenta, yellow, and color temperature correction), project white beams with no dimming and position them for easy comparison. On each fixture, *including the reference*, select UTIL→CAL→C OF and press [Enter]. (This adds a defined amount of cyan.) Select one fixture to be the reference. Adjust the offsets on the other fixtures to match the reference color. Press [Enter] to save the setting. Repeat for M OF (magenta), Y OF (yellow), and CTOF (CTC).

Software upload

The software update mode is normally engaged automatically by the upload device. If this does not occur, see “Software installation” on page 28.

Effects

The MAC 2000 Wash XB is compatible with USITT DMX-512 controllers. The fixture has two DMX operating modes, 8-bit and 16-bit. The 16-bit mode requires two more DMX channels than 8-bit mode but provides more precise pan/tilt positioning. All other functions are identical. See “DMX protocol” on page 30.

Color

The color mixing system uses continuous dichroic cyan, magenta, and yellow (CMY) color filters. It is a subtractive system that removes color from white light. Inserting all three filters results in loss of light: for maximum brightness, mix 2 colors at a time.

In addition, two color wheels are provided, each with four removable positions for dichroic glass color filters and a position for a direct pass through of the beam.

Dimming and strobe

Two dimming systems are available - a built-in mechanical dimmer/shutter and an optional dimmer wheel (orderable separately).

Shutter

The mechanical shutter system provides full-range 100 percent dimming, instant open and blackout, random and variable strobe effects up to 10 Hz, and random and variable pulses in which the dimmer snaps open and slowly dims or snaps closed and slowly opens. Two dimming curves are available; one that simulates a tungsten lamp and another that provides linear dimming (see “Shutter dimming curves” on page 14).

Optional dimmer wheel

A separately orderable dimmer wheel (P/N 62324018) that provides enhanced dimming can be installed in place of color wheel 2. The dimmer wheel uses a logarithmic algorithm that, compared with the dimming available from the shutter system, enables much finer and smoother dimming at the bottom end of the dimming range.

If you use the dimmer wheel, it is recommended that you do not use the shutter system to control intensity, and that the shutters be set to fully open (ensure that 255 is the default DMX value issued on the shutter intensity channel from your controller). You can continue to use other shutter effects, such as the strobe.

The wheel is detected automatically by the fixture when installed. The installation procedure is described in “Installing the optional dimmer wheel” on page 23.

Color temperature correction

The color temperature correction (CTC) system uses a continuous 0 - 178 mireds color filter that lowers the color temperature from 6000 K to 2900 K.

Motorized zoom

The zoom lens widens the 1/10 peak beam angle from 12.5° at full spot to 39° at full flood with the standard Fresnel lens and 50 mm aperture ring fitted.

Beam angles

The following tables list the beam angles available with the standard 50 mm (2 in) aperture ring fitted. Note that narrower beam angles can be achieved by fitting smaller aperture rings. Hypermode provides a high intensity, extra narrow spot with no diffusion. To engage hypermode, set the zoom channel to 100%.

Narrow (PC lens)	**Half-peak angle**	**1/10 peak angle**
Hypermode	5.5°	12.5
Zoom minimum	7°	13°
Zoom maximum	22°	35°

Medium (standard Fresnel lens)	**Half-peak angle**	**1/10 peak angle**
Hypermode	7°	12.5°
Zoom minimum	8.5°	15°
Zoom maximum	24°	39°

Very wide (Super wide, multi-array lens)	**Half-peak angle**	**1/10 peak angle**
Hypermode	37°	73°
Zoom minimum	40°	76°
Zoom maximum	50°	91°

A micro-Fresnel lens available separately as an accessory (P/N 91610092) gives a very narrow, concentrated and sharply defined beam with the following angles:

Very narrow (micro-Fresnel lens)	**Half-peak angle**	**1/10 peak angle**
Hypermode	6.5°	9.5°
Zoom minimum	6.5°	12°
Zoom maximum	18°	33°

For information about changing the lens see “Changing the front lens” on page 22.

Motorized barndoors

A motorized barndoor system that attaches to the front of the fixture is available as a separately orderable accessory. These barndoors can be rotated, or opened and closed using DMX control signals. Five DMX channels are allocated for barndoor control irrespective of whether or not they are connected to the fixture. We have done this to cover the possibility that you rig and begin programming your MAC 2000 Wash XB and add barndoors to it later. If the DMX channels were not already assigned, you would have to re-patch your console and therefore would lose any programming already completed.

Aperture adjustment

A 50 mm (2 in) aperture is fitted as standard in the optical path of the fixture just behind the zoom lens. This works well with the standard Fresnel lens.

Inside the head of the fixture, three additional aperture rings are secured to the chassis by a thumbscrew. When using the PC lens, the best beam characteristic is achieved by attaching the 45 mm aperture ring. For instructions on changing the aperture ring see “Changing the aperture ring” on page 22.

Pan and tilt

The yoke pans 540° and the head tilts 267°. For maximum positioning accuracy, select 16-bit mode.

The pan/tilt speed (fast, norm, or slow) may be selected on the pan/tilt speed channel. Setting the pan/tilt speed channel to “blackout” causes the shutter to black out the light while the head is moving.

Speed control

There are two ways to control the speed at which effects move from one static position to another. These are known as tracking control and vector control and are selected on the Pan/Tilt Speed and Effect Speed Channels. These channels are independent so you may, for example, combine a vector control pan movement with a tracking control color fade.

In tracking mode, speed is determined by the cross-fade time. The controller continuously sends small position changes that the fixture “tracks.” To enable tracking mode, set the relevant speed channel to a tracking value. Note that in addition to enabling tracking control, some tracking values also provide overrides of the menu settings.

In vector mode, speed is set directly on a speed channel. *The cross-fade time must be 0.* Vector control provides a way to set speed on controllers that do not have programmable fade times and results in smooth movement regardless of the cross-fade time or the controller’s processing power.

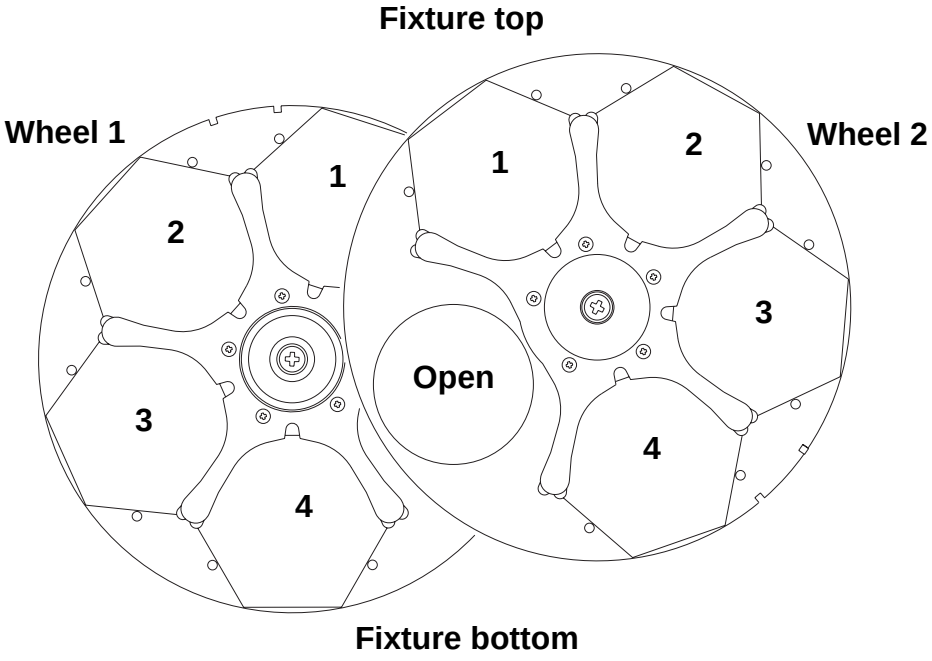
Optics

This chapter describes the elements of the optical path and changes that can be made to them. It covers the:

- Color wheel and filters, below
- Front lenses, on page 22
- Aperture rings, on page 22
- Optional dimmer wheel, on page 23

Color wheels

The following is a view of the color wheels as seen from the lamp.



Color wheel 1

Color wheel 1 provides the following four removable dichroic color filters and an open position.

1 Position 1 - Green 203 (P/N 46402006)

2 Position 2 - Blue 108 (P/N 46402007)

3 Position 3 - UV Transmitter (P/N 46402008)

4 Position 4 - Half Minus Green (P/N 46402009)

5 Position 5 - Open

Color wheel 2

Color wheel 2 provides the following four removable dichroic color filters and an open position:

1 Position 1 - Red 308 (P/N 46402005)

2 Position 2 - Orange 306M (P/N 46402004)

3 Position 3 - Green 208 (P/N 46402002)

4 Position 4 - Blue 102 (P/N 46402001)

5 Position 5 - Open

Changing color filters

Additional color filters can be ordered from Martin.

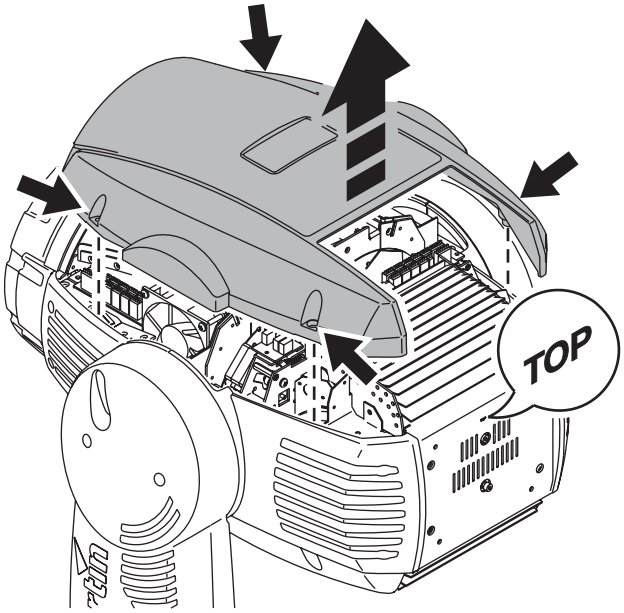
To ensure the best performance, lenses must be fitted with the coated surface away from the lamp.

To change a color filter:

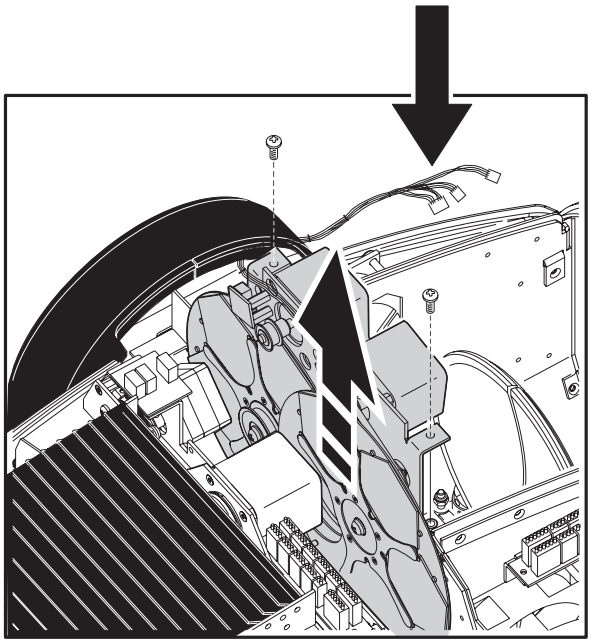
1 Disconnect the fixture from power and allow it to cool.

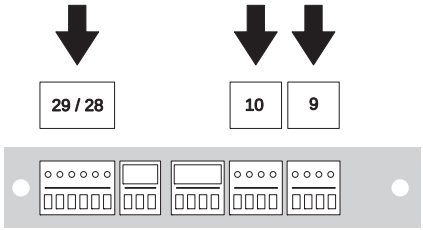
2 Lock the head horizontally with the top cover up.

3 Remove the top cover of the fixture using a flathead screwdriver to unlock the four quarter-turn screws.



4 Remove the two screws holding the color wheel module in place using a Philips screwdriver. Disconnect the cables and lift the whole module out of the fixture.

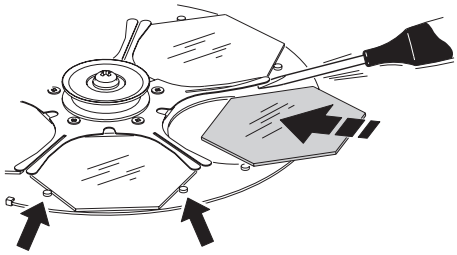




Cable connections

5 Remove filters using your fingers and a soft cloth to protect the lens.

6 To install a filter, use a small flathead screwdriver to lift the filter support leaves on the color wheel.



7 Reinsert the color wheel module, screw it into place, and connect the cables.

8 Replace the fixture cover and apply power.

Changing the front lens

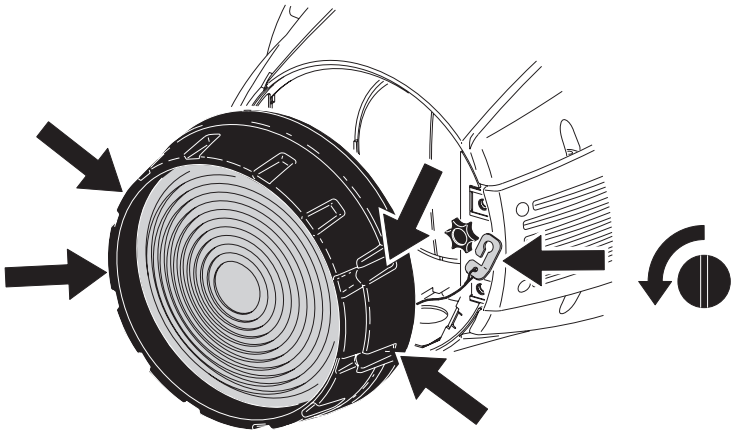
The MAC 2000 Wash XB has a Fresnel lens fitted as standard. A PC lens and a super wide-angle lens are also supplied with the fixture, and a micro-Fresnel lens is available as an accessory (P/N 91610092). Front lenses consist of a front module that attaches to the front of the head with quarter-turn fasteners.

Note that when using the standard Fresnel lens, the 50 mm (2 in) aperture ring provides the highest light output. When the PC lens is fitted, we recommend the use of the 45 mm (1.8 in) aperture ring (see “Changing the aperture ring” on page 22).

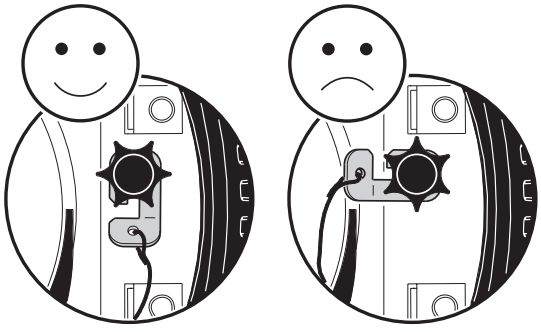
Warning! The front lens is very heavy. Ensure that it is secured to the MAC 2000 Wash XB with the internal safety cable provided.

To change the lens:

1 Remove the lens using a flathead screwdriver to unlock the four quarter-turn screws.



2 Detach the safety cable from the thumb screw and then perform this process in reverse to attach a different lens. Note that when you attach the safety cable it is very important to keep the cable out of the optical path (see illustration on right).



Changing the aperture ring

The MAC 2000 Wash XB comes factory fitted with a 50 mm (2 in) aperture ring (identified by 5 small holes), and 3 optional rings:

- 30 mm (1.2 in) - identified by 3 small holes
- 40 mm (1.6 in) - identified by 4 small holes
- 45 mm (1.8 in) - identified by 4 small holes and a half-crescent

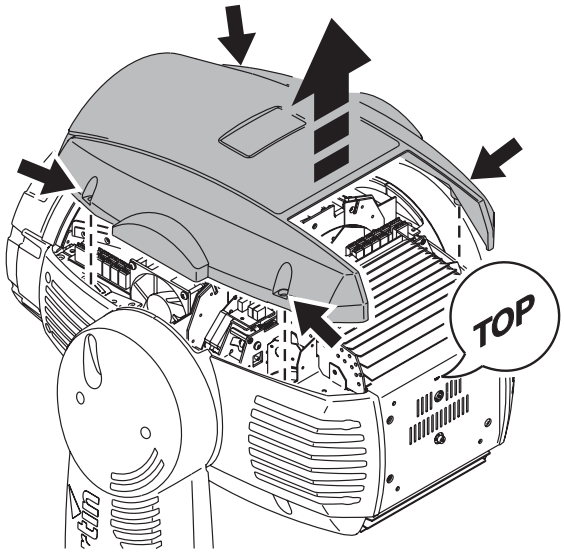
Use of the smaller apertures will result in less light output and a narrower beam angle.

To change an aperture ring:

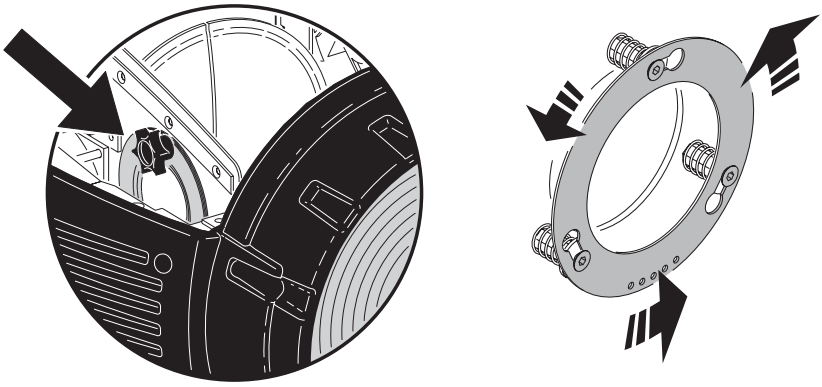
1 Disconnect the fixture from power and allow it to cool.

2 Lock the head horizontally with the top cover up.

3 Remove the top cover of the fixture using a flathead screwdriver to unlock the four quarter-turn screws.



4 The additional aperture rings can be found secured to the chassis with a thumb screw just behind the front lens (see the following illustration). Remove the thumb screw and select the appropriate aperture ring.



5 Remove the currently installed aperture ring, from just behind the zoom lens, by pushing and twisting it.

6 Install the replacement aperture ring, lock the others in place behind the front lens using the thumb screw, and replace the fixture cover.

Installing the optional dimmer wheel

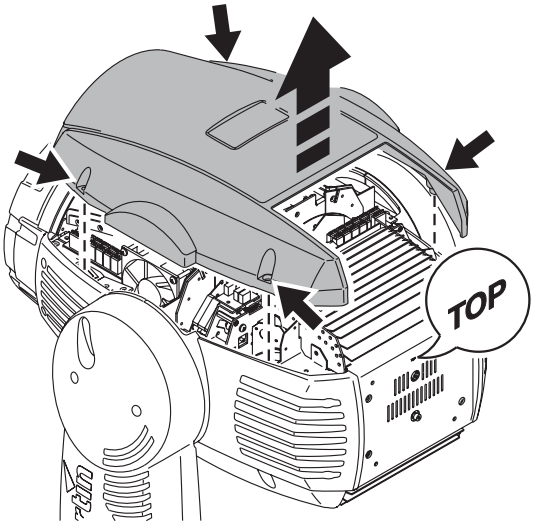
An optional dimmer wheel (orderable separately and supported from software version 1.6) can be installed in place of color wheel 2.

To install the dimmer wheel:

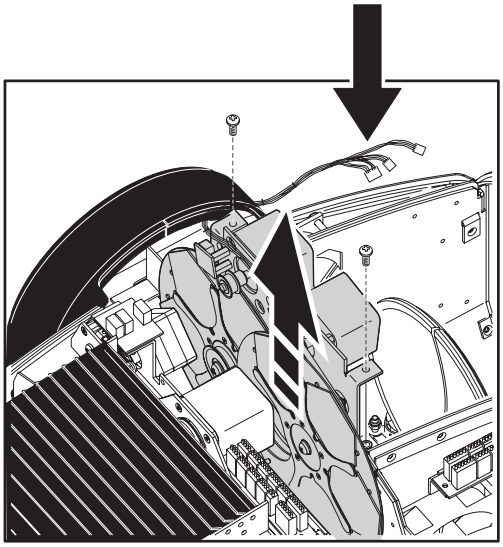
1 Disconnect the fixture from power and allow it to cool.

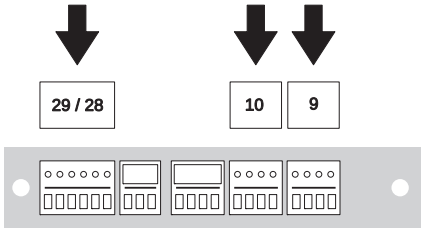
2 Lock the head horizontally with the top cover up.

3 Remove the top cover of the fixture using a flathead screwdriver to unlock the four quarter-turn screws.



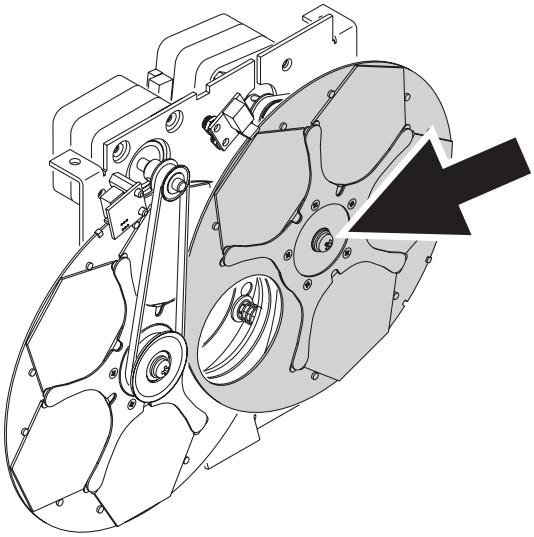
4 Remove the two screws holding the color wheel module in place using a Philips screwdriver. Disconnect the cables and lift the whole module out of the fixture.

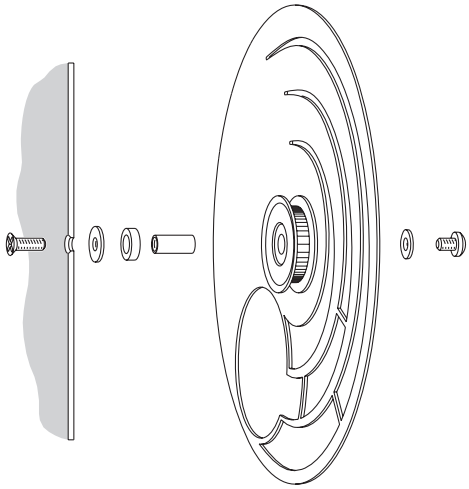




Cable connections

5 Remove color wheel 2 using a Philips screwdriver.





6 Attach the dimmer wheel in place of the color wheel. Ensure that the indexing magnet on the wheel rim is aligned with the sensor on the color wheel module.

The dimmer wheel will be automatically detected when the MAC 2000 Wash XB is powered on and/or reset. When the dimmer wheel is installed, the DMX channel 2 (Intensity) must be maintained at 100%.

Routine maintenance

DANGER! Read “Safety Information” on page 5 before servicing the MAC 2000 Wash XB. Disconnect the fixture from power and allow to cool for 45 before handling or removing any cover. Refer any service operation not described here to a qualified service technician.

Important! Excessive dust, smoke fluid, and particle buildup degrades performance, causes overheating and will damage the fixture. Damage caused by inadequate cleaning or maintenance is not covered by the product warranty.

As with electronic components in general, the MAC 2000 Wash XB’s PCBs are sensitive to ESD (electrostatic discharge). Take precautions to avoid ESD damage before opening the fixture. Service electronic components at a static-safe workstation only.

It is Martin policy to use the best-quality materials and coatings available to ensure optimum performance and the longest possible component lifetimes. However, optical components in all lighting fixtures are subject to wear and tear over the life of the fixture, resulting in gradual changes in color rendition of dichroic filters or the specular properties of reflectors, for example.

The extent of wear and tear depends heavily on operating conditions, maintenance and environment, so it is impossible to specify precise lifetimes for optical components. However, you will eventually need to replace optical components if their characteristics are affected by wear and tear after an extended period of use and if you require fixtures to perform within very precise optical and color parameters.

To maximize the life of the MAC 2000 Wash XB and protect the investment it represents, clean the fixture regularly – especially the cooling systems – following the guidelines in this section.

The lamp

The MAC 2000 Wash XB is supplied with an Osram HTI 1500 W/D7/60 SharXS discharge lamp installed. This source has a color temperature of 6000 K, a color rendering index greater than 85, and an average life of 750 hours. The lamp is capable of hot restrike.

The ends of the lamp are profiled with special keys, as shown in Figure 8, to ensure proper installation. Do not use lamps with keys in a non-keyed SFc 10-4 socket.

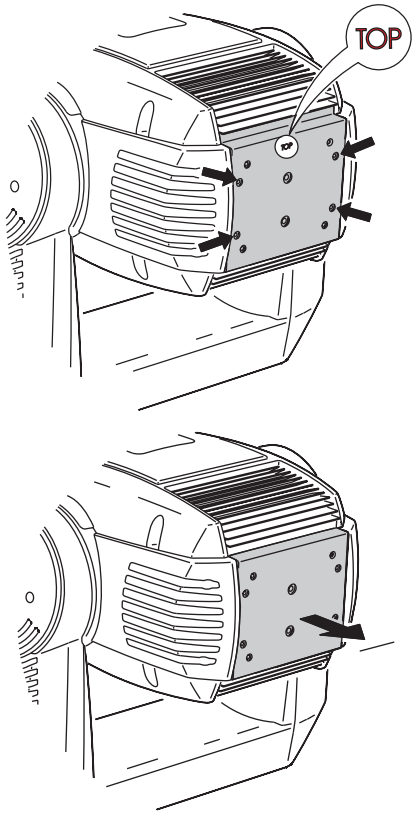


Figure 6: Lamp access

Warning! Install only an approved lamp (see "Lamp" on page 47). Installing any other lamp may create a safety hazard or damage the fixture!

Replace the lamp when it has reached the limit of its 750 hour average life. To reduce the risk of explosion, do not exceed 110% of the lamp's average life, i.e. 825 hours. To read lamp hours from the control panel, please refer to Readouts on page 14.

For optimum performance, avoid turning off the lamp before it has warmed up fully (this takes approximately. 5 minutes).

Replacing the lamp

Important! Do not touch the quartz bulb with bare fingers. Avoid placing stress on the lamp, as this may weaken the bulb and cause premature failure.

The lamp must be replaced with an Osram HTI 1500 W/D7/60 SharXS lamp (available from your Martin dealer under P/N 97010322).

The clear quartz bulb must be clean and free of any oils from your fingers. Clean the lamp with an alcohol wipe and polish it with a dry cloth, particularly if you accidentally touch the bulb.

To replace the lamp:

1 Disconnect the fixture from power and allow it to cool. Lock the head horizontally with the top up.

2 See Figure 6. Release the 4 quarter-turn fasteners marked with arrows on the rear plate. Pull the lamp assembly straight back as far as it goes and let it rest on its retaining pins.

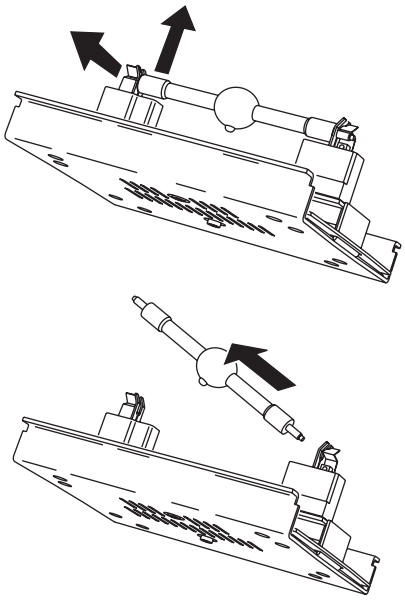


Figure 7: Lamp removal

3 See Figure 7. Pull the retention spring on the left-hand end of the lamp socket up and then swing the end of the lamp out. Pull the other end out of the socket.

4 Inspect the socket for corrosion (see "Replacing the lamp socket" on page 27) and replace if necessary.

5 See Figure 8. With the nipple on the bulb facing the back, insert the right end of the new lamp in the socket. Pull up on the left spring and snap the other end into place.

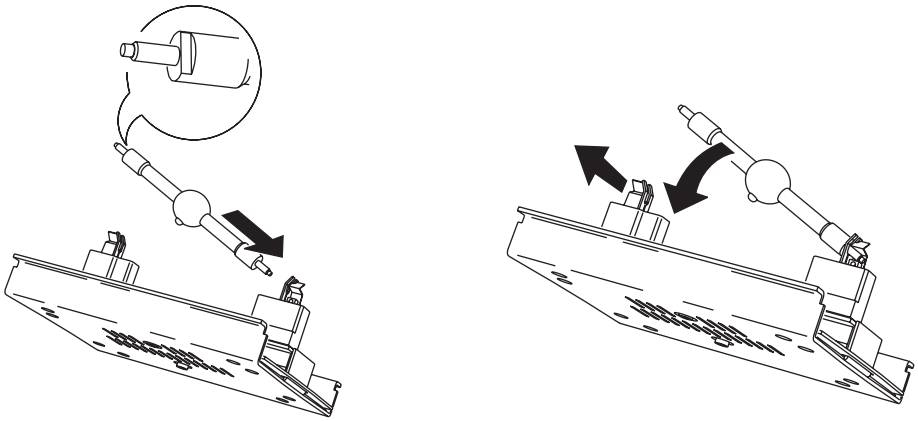


Figure 8: Lamp insertion

6 Lift the lamp assembly so that the lamp is level with the center of the reflector. Push the assembly straight in until it seats, making sure the lamp passes through the reflector opening. Lock the 4 quarter-turn fasteners.

7 When installing a new lamp, reset the lamp hour and lamp strike counters as described in "Time" on page 14.

Aligning the lamp

To align the lamp:

1 Switch on the MAC 2000 Wash XB and allow it to reset. Using either a controller or the control module, turn on the lamp and project an open white beam on a flat surface.

2 Center the hot spot vertically using the top Allen-head adjustment screw in the center of the rear plate.

3 If there is a significant hot spot, turn the bottom adjustment screw counterclockwise until the light is evenly distributed. If the light is brighter around the edge than it is in the center, or if light output is low, turn the bottom adjustment screw clockwise until the light is bright and evenly distributed.

4 Repeat step 2.

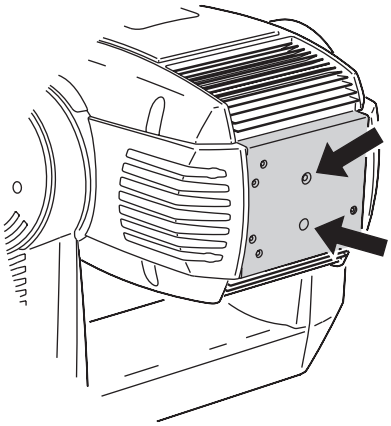


Figure 9: Lamp adjustment

Replacing the lamp socket

The lamp holder used in the MAC 2000 Wash XB eventually wears out due to the high voltages that pass through the contacts. Service life will vary, but as a rule you should plan to replace the holder every 4000 hours approximately.

Wear begins to show up as discoloration at the contact surfaces. When this happens, resistance increases and the lamp becomes harder to strike. If this process is allowed to continue, the lamp is likely to fail prematurely.

Each time the lamp is replaced, inspect the lamp holder and have it replaced by a qualified technician as soon as there are signs of discoloration or pitting at the contact surfaces. Damage caused by failure to replace a worn and/or discolored lamp holder is not covered by the product warranty.

Cleaning

The MAC 2000 Wash XB requires routine cleaning. The schedule depends heavily on the operating environment; please consult a Martin service technician for recommendations.

Important! Excessive dust, smoke fluid, and particle buildup degrades performance, leads to overheating and causes damage to the fixture that is not covered by the warranty.

Use care when cleaning optical components and work in a clean, well lit area. The coated surfaces are fragile and easily scratched. Do not use solvents that can damage plastic or painted surfaces.

Inspect the air filters regularly and clean before they become clogged. Replace the air filters with new ones when replacing the lamp.

To maintain adequate cooling, dust must be cleaned from the fans and air vents periodically.

Optical components

1 Disconnect the fixture from power and allow the components to cool completely. Remove the head cover.

2 Vacuum or gently blow away dust and loose particles with compressed air.

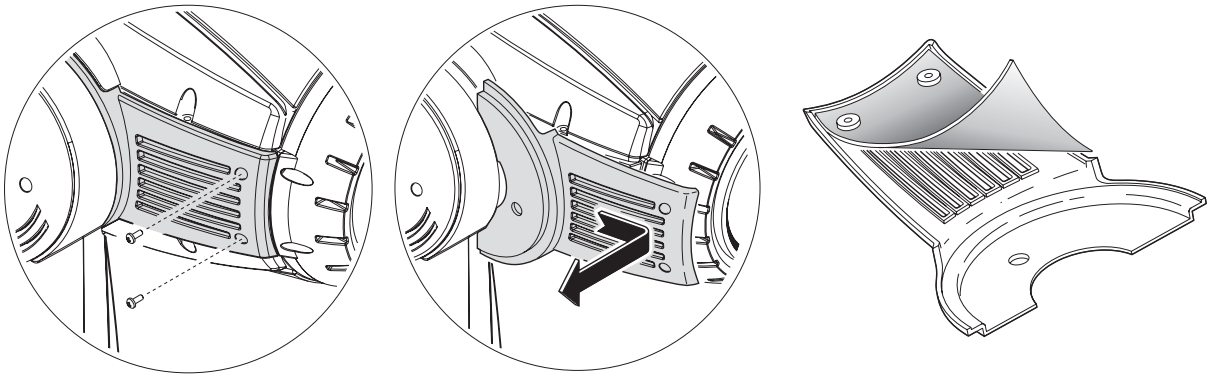
3 Remove stuck particles with an unscented tissue or cotton swab moistened with glass cleaner or distilled water. Do not rub the surface: lift the particles off with a soft repeated press.

4 Remove smoke and other residues with cotton swabs or unscented tissues moistened with isopropyl alcohol. A commercial glass cleaner may be used, but residues must be removed with distilled water. Clean with a slow circular motion from center to edge. Dry with a clean, soft and lint-free cloth or compressed air.

Fan and air vents

Remove dust from the fans and air vents with a soft brush, cotton swab, vacuum, or compressed air.

Cleaning or replacing the air filters



1 Disconnect the fixture from power. On each side of the head, remove the 2 screws that hold the side cover using a Torx-20 screwdriver. Slide the cover forward to remove. Lift the filter off of the cover.

2 Clean the filters with a vacuum or compressed air. If they are saturated with smoke residue or other contaminants, soak them in warm soapy water and blot dry. Replace any filter that is damaged or impossible to get perfectly clean.

3 Place the filters on the covers and replace the covers.

Software installation

The factory-installed software version is indicated on the serial number label. The currently installed software version number is displayed in the control panel during power-on and in the INFO→VER menu.

Software updates are released when features are added. The latest MAC 2000 Wash XB software is available for download from the Support area of the Martin website at http://www.martin.com.

Requirements

Software can be installed using a PC connected to the fixture via a data link using one of the following DMX interface hardware devices:

- Martin DABS 1™, currently available with the Martin MUM™ (Multi Utility Manager) software package
- Martin Universal USB-DMX Interface Box™
- ShowDesigner™ PCI DMX Interface Card (2048 channel version)
- Martin LightJockey™ PCI DMX Interface Card (512 and 2048 channel versions)
- Martin LightJockey™ PCMCIA DMX Interface
- Martin LightJockey™ 4064 ISA DMX Interface Card (DJ and Club versions)

Besides one of the hardware devices listed above, the Martin Software Uploader program, version 5.5 or later, is required. The Software Uploader program is supplied with the MUM and LightJockey programs, as well as with DABS1 hardware devices. It is also available for download from the Support area of the Martin website at http://www.martin.com.

Note: If intermediate control systems such as the Martin Lighting Director™ (MLD) and the Martin Matrix™ are present, they must be bypassed when updating fixture software via the DMX link. These systems do not relay the update code correctly because the code is not DMX-compliant.

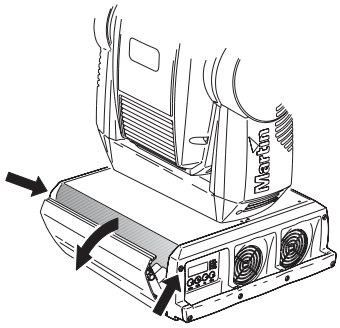
Standard software installation

For guidance on preparing and using your hardware device and the Software Uploader program, refer to the user documentation and/or online help for these products.

What to do if the standard software installation fails

If the normal upload procedure does not work, or if the software update notes call for a boot sector update, move the boot sector jumper at PL16 to the BOOT position before uploading software.

Setting the boot sector jumper



1 Disconnect the fixture from power.

2 Remove the top screws from the ends of the front side panel and tilt the panel down to expose the main circuit board.

3 Using the diagram in “Circuit board connections” on page 46 or the label inside the base, locate the BOOT jumper (PL16). Move the jumper to the “BOOT” position.

4 Perform a boot mode upload. When the upload is complete, disconnect the fixture from power and move the jumper back to the “NORM” position.

Preventing software updates

Software updates are enabled by default, but you can disable this by setting the Write jumper (see “Circuit board connections” on page 46) to the ‘disable’ setting.

DMX protocol

This section contains two DMX protocols:

- “16-bit protocol” on page 31
- “8-bit protocol” on page 34

The fixture is set up to use the 16-bit DMX protocol by default. To modify this, use the control menu. For more information see “Control menu” on page 37.

Ensure that you have the latest software installed. For the latest software updates, documentation, and other information about this and all Martin Professional products, please visit the Martin website at http://www.martin.com.

16-bit protocol

DMX channel	Value	Percent	Function (Start code=0)
1 **NOTE!** The Lamp Off command is only active with: • PERS→dLOF in the control menu set to ON, or with • PERS→dLOF set to OFF, and Cyan, Magenta and Yellow set to 255. The Reset Fixture command is only active with: • PERS→dRES in the control menu set to ON, or with • PERS→dRES set to OFF, and Cyan, Magenta and Yellow set to 255.			**Shutter, strobe, reset, lamp on/off**
	0 – 19	0 – 7	Shutter closed (lamp power reduced to 1200 W after 10 sec.)
	20 – 49	8 – 19	No function (shutter open)
	50 – 72	20 – 28	Strobe fast → slow
	73 – 79	29 – 31	Shutter open, lamp power reduced to 1200 W
	80 – 99	32 – 39	Pulse opening, fast → slow
	100 – 119	40 – 47	Pulse closing, fast → slow
	120 – 127	48 – 50	No function
	128 – 147	51 – 57	Random strobe, fast
	148 – 167	58 – 65	Random strobe, medium
	168 – 187	66 – 73	Random strobe, slow
	188 – 190	74 – 74	No function
	191 – 193	75	Random pulse opening, fast
	194 – 196	76	Random pulse opening, slow
	197 – 199	77	Random pulse closing, fast
	200 – 202	78 – 79	Random pulse closing, slow
	203 – 207	80 – 81	No function
	208 – 217	82 – 85	Reset fixture
	218 – 227	86 – 89	No function
	228 – 237	90 – 93	Lamp on (lamp power on)
	238 – 247	94 – 97	No function
	248 – 255	98 – 100	Lamp off (lamp power off) Note: value must be applied for >5 secs.
2			**Intensity (dimmer blades)**
	0 – 255	0 – 100	0 → 100% (when the optional dimmer wheel is installed this must be set to 100%)
3			**Cyan**
	0 – 255	0 – 100	White → cyan
			Random color (if selected on channel 7)
	0	0	Normal (full range)
	1 – 127	1 – 49	Minimum cyan setting (127 = full cyan)
	128 – 254	50 – 99	Maximum cyan setting (128 = no cyan)
	255	100	Normal (full range)
4			**Magenta**
	0 – 255	0 – 100	White → magenta
			Random color (if selected on channel 7)
	0	0	Normal (full range)
	1 – 127	1 – 49	Minimum magenta setting (127 = full magenta)
	128 – 254	50 – 99	Maximum magenta setting (128 = no magenta)
	255	100	Normal (full range)
5			**Yellow**
	0 – 255	0 – 100	White → yellow
			Random color (if selected on channel 7)
	0	0	Normal (full range)
	1 – 127	1 – 49	Minimum yellow setting (127 = full yellow)
	128 – 254	50 – 99	Maximum yellow setting (128 = no yellow)
	255	100	Normal (full range)

DMX channel	Value	Percent	Function (Start code=0)
6	0 – 255	0 – 100	**CTC** White → CTC
7			**Color wheel 1 (multi color)**
	0	0	White
	1 – 31	1 – 12	White → color 1,1
	32	13	Color 1,1
	33 – 63	14 – 24	Color 1,1 → color 1,2
	64	25	Color 1,2
	65 – 95	26 – 36	Color 1,2 → color 1,3
	96	37	Color 1,3
	97 – 127	38 – 49	Color 1,3 → color 1,4
	128	50	Color 1,4
	129 – 159	51 – 61	Color 1,4 → white
	160	62	White
			Fixed colors on wheel 1
	161 – 165	63 – 64	Color 1,4
	166 – 170	65 – 66	Color 1,3
	171 – 175	67 – 68	Color 1,2
	176 – 180	69 – 70	Color 1,1
	181 – 185	71 – 72	White
			Continuous color wheel 1 scroll
	186 – 214	73 – 83	Fast → slow CW
	215 – 243	84 – 95	Slow → fast CCW
			Random color CMY (set min. or max. CMY limits on channels 3-5)
	244 – 247	96	Random color, fast
	248 – 251	97 – 98	Random color, medium
	252 – 255	99 – 100	Random color, slow
8 ***(if color wheel 2 is installed)***			**Color wheel 2 (multi color, MCW) - *if installed***
	0	0	White
	1 – 31	1 – 12	White → color 2, 1
	32	13	Color 2, 1
	33 – 63	14 – 24	Color 2, 1 → color 2, 2
	64	25	Color 2, 2
	65 – 95	26 – 37	Color 2, 2 → color 2, 3
	96	38	Color 2,3
	97 – 127	39 – 50	Color 2, 3 → color 2, 4
	128	51	Color 2, 4
	129 – 159	52 – 62	Color 2, 4 → white
	160	63	White
			Fixed colors on wheel 2
	161 – 165	64 – 65	Color 2, 4
	166 – 170	66 – 66	Color 2, 3
	171 – 175	67 – 68	Color 2, 2
	176 – 180	69 – 70	Color 2, 1
	181 – 185	71 – 72	White
			Continuous color wheel 2 scroll
	186 – 214	73 – 84	Fast → slow CW
	215 – 243	85 – 95	Slow → fast CCW
	244 – 255	96 – 100	No function
8 ***(if dimmer wheel is installed)***	0 – 255	0 – 100	**Intensity - (dimmer wheel) - *if installed*** 0 → 100% (see “Optional dimmer wheel” on page 17)
9			**Zoom**
	0 – 244	0 – 95	Zoom, wide → narrow
	245 – 251	96 – 98	No changes
	252 – 255	99 – 100	Open (power mode)

DMX channel	Value	Percent	Function (Start code=0)
10	0 – 255	0 – 100	**Barndoor 1 (Upper)** Out → in
11	0 – 255	0 – 100	**Barndoor 2 (Lower)** Out → in
12	0 – 255	0 – 100	**Barndoor 3 (Left)** Out →in
13	0 – 255	0 – 100	**Barndoor 4 (Right)** Out → in
14	0 – 255	0 – 100	**Rotate barndoors** Right → center → left (center = 127)
15			**MACRO functions (Barndoors)**
	0 – 20	0 – 7	No macro action
	21 – 40	8 – 15	All doors at 50%
	41 – 60	16 – 23	No macro action
	61 – 80	24 – 31	Large doors at 80% and small doors at 0%
	81 – 100	32 – 39	No macro action
	101 – 120	40 – 48	Small doors at 80% and large doors at 0%
	121 – 255	49 – 100	No macro action
16			**Pan coarse (Most Significant Byte)**
	0	0	Max. left
	127	50	Neutral
	255	100	Max. right
17			**Pan fine (Least Significant Byte)**
	0	0	Max. left
	127	50	Neutral
	255	100	Max. right
18			**Tilt coarse (Most Significant Byte)**
	0	0	Max. up
	127	50	Neutral
	255	100	Max. down
19			**Tilt fine (Least Significant Byte)**
	0	0	Max. up
	127	50	Neutral
	255	100	Max. down
20			**Speed: pan/tilt movement**
	0 – 2	0 – 1	Tracking
	3 – 236	2 – 92	Speed, fast → slow
	237 – 239	93	Tracking, slow speed (overrides the PTSP menu setting)
	240 – 242	94	Tracking, normal speed (overrides the PTSP menu setting)
	243 – 245	95	Tracking, fast speed (overrides the PTSP menu setting)
	246 – 248	96 – 97	Fan speed, regulated for low noise (overrides the FANS menu setting)
	249 – 251	98	Fan speed, full speed for max. cooling (overrides the FANS menu setting)
	252 – 255	99 – 100	No function
21			**Speed: dimmer, cyan, magenta, yellow, CTC, zoom**
	0 – 2	0	Tracking
	3 – 239	1 – 93	Speed, fast → slow
	240 – 242	94 – 95	Tracking, studio mode disabled (overrides the MODE menu setting)
	243 – 245	96	Tracking, studio mode enabled (overrides the MODE menu setting)
	246 – 248	97 – 98	Tracking, shortcuts disabled (overrides the SCUT menu setting)
	249 – 251	99	Tracking, shortcuts enabled (overrides the SCUT menu setting)
	252 – 255	100	Fast speed
			Speed: color 1, color 2, barndoors
	0 – 2	0	Tracking
	3 – 239	1 – 93	Speed, fast → slow
	240 – 242	94 – 95	Tracking, studio mode disabled (overrides the MODE menu setting)
	243 – 245	96	Tracking, studio mode enabled (overrides the MODE menu setting)
	246 – 248	97 – 98	Tracking, shortcuts disabled (overrides the SCUT menu setting)
	249 – 251	99	Tracking, shortcuts enabled (overrides the SCUT menu setting)
	252 – 255	100	No function

8-bit protocol

DMX channel	Value	Percent	Function (Start code=0)
1 **NOTE!** The Lamp Off command is only active with: • PERS→dLOF in the control menu set to ON, or with • PERS→dLOF set to OFF, and Cyan, Magenta and Yellow set to 255. The Reset Fixture command is only active with: • PERS→dRES in the control menu set to ON, or with • PERS→dRES set to OFF, and Cyan, Magenta and Yellow set to 255.			**Shutter, strobe, reset, lamp on/off**
	0 – 19	0 – 7	Shutter closed (lamp power reduced to 1200 W after 10 sec.)
	20 – 49	8 – 19	No function (shutter open)
	50 – 72	20 – 28	Strobe on, fast → slow
	73 – 79	29 – 31	Shutter open, lamp power reduced to 1200 W
	80 – 99	32 – 39	Pulse opening, fast → slow
	100 – 119	40 – 47	Pulse closing, fast → slow
	120 – 127	48 – 50	No function
	128 – 147	51 – 57	Random strobe, fast
	148 – 167	58 – 65	Random strobe, medium
	168 – 187	66 – 73	Random strobe, slow
	188 – 190	74 – 74	No function
	191 – 193	75	Random pulse opening, fast
	194 – 196	76	Random pulse opening, slow
	197 – 199	77	Random pulse closing, fast
	200 – 202	78 – 79	Random pulse closing, slow
	203 – 207	80 – 81	No function
	208 – 217	82 – 85	Reset fixture
	218 – 227	86 – 89	No function
	228 – 237	90 – 93	Lamp on (lamp power on)
	238 – 247	94 – 97	No function
	248 – 255	98 – 100	Lamp off (lamp power off) Note: value must be applied for >5 secs.
2			**Intensity (dimmer blades)**
	0 – 255	0 – 100	0 → 100% (when the optional dimmer wheel is installed this must be set to 100%)
3			**Cyan**
	0 – 255	0 – 100	White → cyan
			Random color (if selected on channel 7)
	0	0	Normal (full range)
	1 – 127	1 – 49	Minimum cyan setting (127 = full cyan)
	128 – 254	50 – 99	Maximum cyan setting (128 = no cyan)
	255	100	Normal (full range)
4			**Magenta**
	0 – 255	0 – 100	White → magenta
			Random color (if selected on channel 7)
	0	0	Normal (full range)
	1 – 127	1 – 49	Minimum magenta setting (127 = full magenta)
	128 – 254	50 – 99	Maximum magenta setting (128 = no magenta)
	255	100	Normal (full range)
5			**Yellow**
	0 – 255	0 – 100	White → yellow
			Random color (if selected on channel 7)
	0	0	Normal (full range)
	1 – 127	1 – 49	Minimum yellow setting (127 = full yellow)
	128 – 254	50 – 99	Maximum yellow setting (128 = no yellow)
	255	100	Normal (full range)
6			**CTC**
	0 – 255	0 – 100	White → CTC

DMX channel	Value	Percent	Function (Start code=0)
7			**Color wheel 1 (multi color)**
	0	0	White
	1 – 31	1 – 12	White → color 1,1
	32	13	Color 1,1
	33 – 63	14 – 24	Color 1,1 → color 1,2
	64	25	Color 1,2
	65 – 95	26 – 36	Color 1,2 → color 1,3
	96	37	Color 1,3
	97 – 127	38 – 49	Color 1,3 → color 1,4
	128	50	Color 1,4
	129 – 159	51 – 61	Color 1,4→white
	160	62	White
			Fixed colors 1
	161 – 165	63 – 64	Color 1,4
	166 – 170	65 – 66	Color 1,3
	171 – 175	67 – 68	Color 1,2
	176 – 180	69 – 70	Color 1,1
	181 – 185	71 – 72	White
			Continuous color 1 scroll
	186 – 214	73 – 83	Fast → slow CW
	215 – 243	84 – 95	Slow → fast CCW
			Random color CMY (set min. or max. CMY limits on channels 3-5)
	244 – 247	96	Random color, fast
	248 – 251	97 – 98	Random color, medium
	252 – 255	99 – 100	Random color, slow
8 ***(if color wheel 2 is installed)***			**Color wheel 2 (multi color, MCW) - *if installed***
	0	0	White
	1 – 31	1 – 12	White → color 2, 1
	32	13	Color 2, 1
	33 – 63	14 – 24	Color 2, 1 → color 2, 2
	64	25	Color 2, 2
	65 – 95	26 – 37	Color 2, 2 → color 2, 3
	96	38	Color 2,3
	97 – 127	39 – 50	Color 2, 3 → color 2, 4
	128	51	Color 2, 4
	129 – 159	52 – 62	Color 2, 4 → white
	160	63	White
			Fixed Colors 2
	161 – 165	64 – 65	Color 2, 4
	166 – 170	66 – 66	Color 2, 3
	171 – 175	67 – 68	Color 2, 2
	176 – 180	69 – 70	Color 2, 1
	181 – 185	71 – 72	White
			Continuous Color 2 Scroll
	186 – 214	73 – 84	Fast → slow CW
	215 – 243	85 – 95	Slow → fast CCW
	244 – 255	96 – 100	No function
8 ***(if dimmer wheel is installed)***	0 – 255	0 – 100	**Intensity - (Dimmer Wheel) - *if installed*** 0 → 100% (see “Optional dimmer wheel” on page 17)
9			**Zoom**
	0 – 244	0 – 95	Zoom, wide → narrow
	245 – 251	96 – 98	No changes
	252 – 255	99 – 100	Open (hypermode)
10			**Barndoor 1 (Upper)**
	0 – 255	0 – 100	Out → in

DMX channel	Value	Percent	Function (Start code=0)
11	0 – 255	0 – 100	**Barndoor 2 (Lower)** Out → In
12	0 – 255	0 – 100	**Barndoor 3 (Left)** Out → In
13	0 – 255	0 – 100	**Barndoor 4 (Right)** Out → In
14	0 – 255	0 – 100	**Rotate barndoors** Right → center → Left (Center = 127)
15	0 – 20	0 – 7	**MACRO functions (Barndoors)** No macro action
	21 – 40	8 – 15	All doors at 50%
	41 – 60	16 – 23	No macro action
	61 – 80	24 – 31	Large doors at 80% and small doors at 0%
	81 – 100	32 – 39	No macro action
	101 – 120	40 – 48	Small doors at 80% and large doors at 0%
	121 – 255	49 – 100	No macro action
16	0	0	**Pan** Max. left
	127	50	Neutral
	255	100	Max. right
17	0	0	**Tilt** Max. up
	127	50	Neutral
	255	100	Max. down
18	0 – 2	0 – 1	**Speed: pan/tilt movement** Tracking
	3 – 236	2 – 92	Speed, fast → slow
	237 – 239	93 – 94	Tracking, slow speed (overrides the PTSP menu setting)
	240 – 242	95	Tracking, normal speed (overrides the PTSP menu setting)
	243 – 245	96	Tracking, fast speed (overrides the PTSP menu setting)
	246 – 248	97	Fan speed, regulated for low noise (overrides the FANS menu setting)
	249 – 251	98	Fan speed, full speed for max. cooling (overrides the FANS menu setting)
	252 – 255	99 – 100	No function
19	0 – 2	0 – 1	**Speed: dimmer, cyan, magenta, yellow, CTC, zoom** Tracking
	3 – 239	2 – 93	Speed, fast → slow
	240 – 242	93 – 94	Tracking, studio mode disabled (overrides the MODE menu setting)
	243 – 245	95 – 96	Tracking, studio mode enabled (overrides the MODE menu setting)
	246 – 248	97	Tracking, shortcuts disabled (overrides the SCUT menu setting)
	249 – 251	98	Tracking, shortcuts enabled (overrides the SCUT menu setting)
	252 – 255	99 – 100	Fast speed
			Speed: color 1, color 2, barndoors
	0 – 2	0 – 1	Tracking
	3 – 239	2 – 93	Speed, fast → slow
	240 – 242	93 – 94	Tracking, studio mode disabled (overrides the MODE menu setting)
	243 – 245	95 – 96	Tracking, studio mode enabled (overrides the MODE menu setting)
	246 – 248	97	Tracking, shortcuts disabled (overrides the SCUT menu setting)
	249 – 251	98	Tracking, shortcuts enabled (overrides the SCUT menu setting)
	252 – 255	99 – 100	No function

Control menu

This control menu applies to the software version installed in the MAC 2000 Wash XB as supplied. Software is occasionally updated with improvements and new features. For the latest software updates, please visit the Martin website at http://www.martin.com.

Default values are in bold.

Menu	Item	Options	Notes (Default settings in bold print)
AddR	-	1-512	DMX address.
PSET	-	16bt	**Full control with fine pan, tilt and gobo indexing.**
		8bt	Full control with coarse pan, tilt and gobo indexing.
PATI	SWAP	ON	Map DMX pan control to tilt channel and vice versa.
		OFF	**Normal pan and tilt control.**
	PINV	ON	Reverse DMX pan control, right → left.
		OFF	**Normal pan control, left → right.**
	TINV	ON	Reverse DMX tilt control, down → up.
		OFF	**Normal tilt control, up → down.**
PTSP	-	NORM	**Medium pan/tilt speed.**
		FAST	Optimize movement for speed.
		SLOW	Optimize movement for smoothness.
Stud	-	ON	Optimize effects for silence.
		OFF	**Optimize effects for speed.**

Menu	Item	Options	Notes (Default settings in bold print)
PERS	dISP	ON	**Display permanently on.**
		OFF	Display enters sleep mode 2 minutes after last key press.
	dINT	10 - 100	Adjust display intensity **(default = 100)**.
	dLOF	ON	Enable DMX lamp off command.
		OFF	**Disable DMX lamp off command.**
	dRES	OFF	Disable DMX reset command.
		ON	**Enable DMX reset command.**
	ALON	OFF	**No automatic lamp strike.**
		ON	Lamp strikes automatically within 90 seconds of power on.
		dMX	Lamp strikes if DMX is present. Lamp automatically switches off after 15 mins if there is no DMX signal.
	SCUT	ON	**Color wheels (1&2) turn shortest distance between positions.**
		OFF	Color wheel paths oscillate.
	TRAC	MOdE	Tracking modes.
		- MOd2	Real delta value algorithm.
		- MOd 1	**Absolute delta value algorithm (for most controllers).**
		CAL	1 - 10. Tracking sample rate. Increasing this can help if pan/tilt is not smooth. **(Default = 6).**
	dICU	dIM2	Dimmer curve 2 - linear. This has no influence on the optional dimmer wheel.
		dIM 1	**Dimmer curve 1 - simulated tungsten. This has no influence on optional dimmer wheel.**
	CMYb	ON	Enable CMY blackout 3 seconds after the shutter closes to 0% intensity.
		OFF	**Disable CMY blackout.**
dFSE	FACT	LOAD	Return all settings (not calibrations) to factory defaults.
	CUS 1 CUS2 CUS3	LOAd	Load custom configuration.
		SAVE	Save current configuration.
INFO	TIME→HRS	TOTL	Total hours of operation since manufacture.
		RSET	Hours of operation since counter reset. To reset, display counter and press [Up] for 5 seconds.
	TIME→L HR	TOTL	Total hours of operation with lamp on since manufacture.
		RSET	Lamp hours since counter reset. To reset, display counter and press [Up] for 5 seconds.
	TIME→L ST	TOTL	Total number of lamp strikes since fabricated.
		RSET	Number of lamp strikes since counter reset. To reset, display counter and press [Up] for 5 seconds.
	TEMP	HEAd	Head temperature.
		bASE	Base temperature.
	VER	-	CPU software version.
	bVER	-	Barndoor CPU software version displayed. This is only available when the barndoor unit is installed.
dMXL	-	STCO	Decimal value of the DMX start code. The start code must be 0 for the MAC 2000 Wash XB to function properly.
		dIM..EFSP	DMX value (from 0 - 255) received for each channel.

Menu	Item	Options	Notes (Default settings in bold print)
MAN	RST	-	Reset fixture.
	L ON	-	Lamp on.
	LoFF	-	Lamp off.
	SHUT	OPEN	Open shutter.
		CLOS	Close shutter.
		STRF	Fast strobe.
		STRM	Medium strobe.
		STRS	Slow strobe.
	dIM	0-255	Dimmer.
	CYAN – MAG – YEL	0-255	White - Cyan - Magenta - Yellow
	CTC	0-255	Color temperature correction. Cold → warm (0-178 mireds).
	COL 1	OPEN	Color wheel 1. Open position.
		COL 1	Color wheel 1. Color position 1.
		COL2	Color wheel 1. Color position 2.
		COL3	Color wheel 1. Color position 3.
		COL4	Color wheel 1. Color position 4.
		CW F	Color wheel 1. Clockwise wheel rotation, fast.
		CCWF	Color wheel 1. Counter clockwise wheel rotation, fast.
		CW M	Color wheel 1. Clockwise wheel rotation, medium.
		CCWM	Color wheel 1. Counter clockwise wheel rotation, medium.
		CW S	Color wheel 1. Clockwise wheel rotation, slow.
		CCWS	Color wheel 1. Counter clockwise wheel rotation, slow.
		RNDF	Random CMY color, fast.
		RNDM	Random CMY color, medium.
		RNDS	Random CMY color, slow.

Menu	Item	Options	Notes (Default settings in bold print)
MAN (contd.)	COL2 *(available if color wheel 2 is installed)*	OPEN	Color wheel 2. Open position.
		COL 1	Color wheel 2. Color position 1.
		COL2	Color wheel 2. Color position 2.
		COL3	Color wheel 2. Color position 3.
		COL4	Color wheel 2. Color position 4.
		CW F	Color wheel 2. Clockwise wheel rotation, fast.
		CCWF	Color wheel 2. Counter clockwise wheel rotation, fast.
		CW M	Color wheel 2. Clockwise wheel rotation, medium.
		CCWM	Color wheel 2. Counter clockwise wheel rotation, medium.
		CW S	Color wheel 2. Clockwise wheel rotation, slow.
		CCWS	Color wheel 2. Counter clockwise wheel rotation, slow.
	DIMW *(available if optional dimmer wheel is installed)*	0-255	Dimmer wheel.
	ZOOM	0-255	Zoom: Narrow → Floodspot.
	b1IO	0-255	Barndoor 1. Move in/out. Only available when barndoors are installed.
	b2IO	0-255	Barndoor 2. Move in/out. Only available when barndoors are installed.
	b3IO	0-255	Barndoor 3. Move in/out. Only available when barndoors are installed.
	b4IO	0-255	Barndoor 4. Move in/out. Only available when barndoors are installed.
	PAN	0-255	Pan: left → right
	TILT	0-255	Tilt: up → down
TSEQ	-	RUN	Run a general test of all effects

Menu	Item	Options	Notes (Default settings in bold print)
UTIL (Press and hold **Enter** for a few seconds to use this menu)	FEbA	ON	Enable pan/tilt position correction system.
		OFF	Disable pan/tilt feedback. Setting not saved.
	EFFb	ON	Enable on-the-fly reset of color wheels.
		OFF	Disable on-the-fly reset of color wheels.
	AdJ	–	See “Adjustment submenu” on page 42.
	CAL→P OF	1 - 255	Pan offset (default is 128).
	CAL→T OF	1 - 255	Tilt offset (default is 128).
	CAL→d OF	1 - 255	Dimmer offset (default is 128).
	CAL→C OF	1 - 255	Cyan offset (default is 128).
	CAL→M OF	1 - 255	Magenta offset (default is 128).
	CAL→Y OF	1 - 255	Yellow offset (default is 128).
	CAL→CTOF	1 - 255	CTC offset (default is 128).
	CAL→C 1OF	1 - 255	Color wheel 1 offset (default is 128).
	CAL - C2OF, or - DIMW	1 - 255	Color wheel 2 or Dimmer wheel offset (default is 128).
	CAL→ZOOF	1 - 255	Zoom offset (default is 128).
	dFOF	SURE	Return all offsets to the default settings.
	PCbT	LEd	PCB test – for service use only.
	FANS	VREG	Variable fan regulation. Runs the fans at a minimum noise level. Switches off the head fans and reduces the base fans when lamp is OFF. Enabling this option increases the operating temperature and thus increases the wear on components.
		FULL	**Operate cooling fans at full speed.**
		REG	Regulate the effect cooling fans for quieter performance. Enabling this option increases the operating temperature and thus increases wear on the components.
	UPLd	SURE	Manually set fixture to software update mode.
SMSG	REPLACE LAMP		Displayed when lamp hours exceed average life (750 hours). Replace lamp.
	FIxTURE OVERHEATING		Scrolls in the display if head temperature exceeds 120° C (248° F).

Adjustment submenu

These functions are used by Martin service technicians to adjust the fixture. This menu is located under UTIL→AdJ.

Menu	Item	Options	Notes
RST	-	-	Reset fixture.
L ON	-	-	Strike lamp.
LoFF	-	-	Douse lamp.
HEAd	dIM	OPEN	Open dimmer.
		AdJ	Turn dimmer to adjustment position (closed mechanical stop).
		CLOS	Close dimmer.
		STRO	Strobe.
	CYAN MAG YEL CTC	ON S MIN MAx	Switch test position. Color flags out. Color flags in.
	ZOOM	NARR	Zoom to spot (narrow beam).
		WIdE	Zoom to flood (wide beam).
	Bd 1..4	CLOS	Barndoor 1..4 closed position.
		AdJ	Barndoor 1..4 closed adjust position (no power).
		1..255	Barndoor 1..4 vertical adjust position.
	Bd R	SW P	Barndoor rotation, switch position.
		CW	Barndoor CW position.
		CCW	Barndoor CCW position.
PATI	-	NEUT	Move pan and tilt to neutral positions.
		PNTd	Pan neutral, tilt down.
		PNTU	Pan neutral, tilt up.
		PLTN	Pan left, tilt neutral.
		PRTN	Pan right, tilt neutral.
		PLTd	Pan left, tilt down.
		PRTU	Pan right, tilt up.

Display messages

Message	Appears when...	What to do
RST (Reset)	... the fixture is indexing effects at startup.	Wait for reset to complete.
SRST (Serial reset)	... the fixture has received a reset command from the controller.	Wait for reset to complete. Set PERS→dRES to OFF to prevent accidental reset commands.
HOME	... the effects have been indexed and are moving to their default positions.	Wait a few moments.
OPEN	...the lamp access cover is not fully closed.	Verify that the lamp access cover is locked in place.
LERR (Lamp error)	... the lamp does not ignite within 10 minutes of receiving a 'Lamp ON' command. Probable causes are lamp missing/defective, or insufficient AC voltage.	Check the lamp. Check that the voltage and frequency settings match the local supply.
LAEx (Lamp explosion mode)	...the fixture has entered lamp explosion mode because it has detected a lamp failure. Pan and tilt are locked and DMX control is disabled to minimize the risk of falling lamp debris if the bulb has shattered.	Check the lamp. Pan and tilt are released and DMX control is re-enabled when power is reapplied.
LTER	...there is a lamp temperature error.	Set fan speed to FULL using the UTIL menu and restart the fixture. Contact Martin service personnel if problem persists.
MERR (Memory error)	...the EEPROM memory cannot be read.	Contact Martin service personnel for assistance.
ShER (Short error)	... the fixture detects the lamp is on but no 'Lamp ON' command has been received. This can occur if the lamp relay is stuck or if the lamp-power feedback circuit fails. The fixture may be operated but remote lamp on/off may be affected.	Contact Martin service personnel for assistance.
bTER (Base temperature error) HTER (Head temperature error)	... there is a fault with the temperature sensor in the base or head.	Contact Martin service personnel for assistance.
FbEP (Feedback error pan) FbET (Feedback error tilt) FbER (Feedback error pan & tilt)	...pan, tilt, or both pan and tilt feedback circuits are malfunctioning. It is still possible to operate the fixture, although it switches to "safe" mode with reduced maximum speed, thus preventing the fixture from losing track of its home position (losing step).	Contact Martin service personnel for assistance.
PAER (Pan time-out) TIER (Tilt time-out) CYER (Cyan time-out) MAER (Magenta time-out) YEER (Yellow time-out) CTER (CTC time-out) C1ER (Color wheel 1) C2ER (Color wheel 2/dimmer wheel time-out) ZOER (Zoom time-out)	...the electric indexing circuit is malfunctioning. The fixture will, after the time-out, establish a mechanical stop, and continue to work normally.	Reset fixture. Contact Martin service personnel if problem continues.
RDER	...the barndoor rotation mechanism is malfunctioning.	Reset fixture. Contact Martin service personnel if problem continues.

Table 2: Display messages

Message	Appears when...	What to do
535C (Color wheel 1 sensor) 545C (Color wheel 2 sensor) 555C (Barn dr. rotation sensor) 565C (Barn dr. presence sensor) 575C (Yellow/CTC sensor) 585C (Cyan/magenta sensor) 595C (Zoom sensor)	...an effect does not move away from the index position under reset, a sensor or micro-switch circuit is short-circuited, or a micro-switch is stuck or connected incorrectly.	Contact Martin service personnel for assistance.
RAME	...there is an onboard RAM memory error.	Contact Martin service personnel for assistance.
OPER	...there is an onboard programming error.	Contact Martin service personnel for assistance.

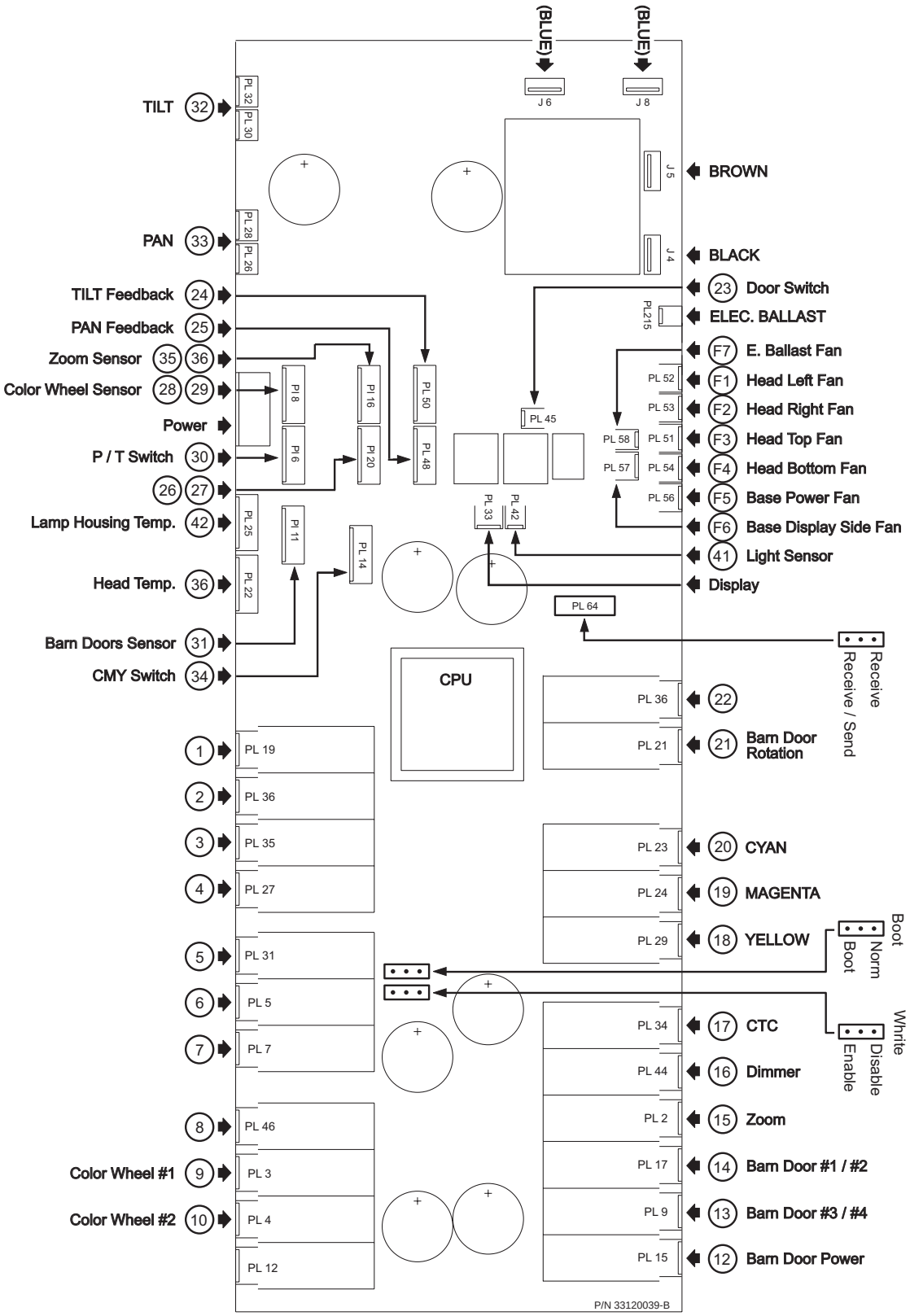
Table 2: Display messages

Troubleshooting

Problem	Probable cause(s)	Remedy
One or more fixtures is completely dead.	No power to fixture.	Check that power is applied and cables are plugged in.
	Primary fuse blown (located near power inlet).	Disconnect fixture and replace fuse.
	Secondary fuse(s) blown (located on PCB inside base).	Disconnect fixture. Check fuses on PCB and replace.
Fixtures reset correctly but respond erratically or not at all to the controller.	Bad data link.	Inspect connections and cables. Correct poor connections. Repair or replace damaged cables.
	Data link not terminated.	Insert DMX termination plug in output of the last fixture on the link.
	Incorrect addressing of the fixtures.	Check fixture address and protocol settings.
	One of the fixtures is defective and disturbs data transmission on the link.	Bypass one fixture at a time until normal operation is regained: unplug the XLR in and out connectors and connect them directly together. Have the defective fixture serviced by a qualified technician.
	XLR pin-out on fixtures does not match (pins 2 and 3 reversed).	Install a phase-reversing cable between the fixtures or swap pins 2 and 3 in the fixture that behaves erratically.
Time-out error after fixture reset.	Effect requires mechanical adjustment.	Disable pan/tilt feedback and on-the-fly color wheel resets (see page 41) as a temporary fix. Contact Martin for service.
Mechanical effect loses position.	Mechanical train requires cleaning, adjustment, or lubrication.	Contact Martin for service.
No light and LERR error message displayed.	The power supply setting does not match local AC voltage.	Disconnect fixture. Check the fixture's internal power supply switch is set to the correct AC supply voltage.
	Lamp blown	Disconnect fixture and replace lamp.
	Lamp not installed	Disconnect fixture and install lamp.
	Lamp access safety switch open	Check that lamp access plate is fully seated and locked in place.
	Lamp refusing to hot re-strike	Check lamp hours and lamp condition. Replace lamp if necessary.
Lamp cuts out intermittently.	Fixture is too hot.	Ensure free airflow around air vents. Disconnect fixture and clean fans, vents and air filters. Check that ambient temperature does not exceed max. permitted level.

If the service lamp is lit, check the SMSG menu using the control panel.

Circuit board connections



Specifications

Physical

Length	408 mm (16.0 in)
Width	490 mm (19.3 in)
Height	750 mm (29.5 in)
Weight	38 kg (83.8 lbs)

Lamp

Type	1500 W short arc discharge
Fitted as standard	Osram HTI 1500 W/D7/60 SharXS
Color temperature	6000 K
CRI (color rendering index)	>90
Average lifetime	750 hours
Hot restrike	Yes
Base	Double-ended SFc 10-4 with key
Ballast	Electronic

Dynamic Effects

CMY	independently variable 0 - 100%
Color Temperature Correction	0 - 178 mireds, continuously variable
Color wheel	2 wheels, each with 4 interchangeable filters + open position
Dimmer/shutter	Strobe effect up to 10 Hz, pulse effects, instant open and blackout
Zoom	PC lens 12.5° - 35°, Fresnel lens 12.5° - 39°, super wide (multi-array) lens 73° - 91° (1/10 peak angles with 50 mm aperture)
Hypermode	Extra bright, narrow beam
Pan	540°
Tilt	267°

Control and Programming

DMX channels	19/21
Setting and addressing	Control panel with LED display
16-bit control	Pan & tilt
Movement control options	Tracking and vector
Protocol	USITT DMX512/1990
Receiver	Opto-isolated RS-485
Firmware update	Serial upload via DMX link

Construction

Housing	UV-resistant fiber-reinforced composite
Color	Black
Reflector	Glass, cold light
Protection rating	IP 20

Installation

Minimum distance to combustible materials	1 m (39 in.)
Minimum distance to illuminated surfaces	3 m (10 ft.)
Minimum distance around fans and vents	0.1 m (4 in.)
Orientation	Any
Mounting points	8 pairs of 1/4-turn locks, 45° possible

Connections

AC power input	3 m integral cable without power plug
DMX data in/out	3-pin and 5-pin locking XLR

Electrical

AC power	200-240 V nominal, 50/60 Hz
Power supply unit	Auto-ranging electronic switch-mode
Main fuse	15 AT (x 2)
Fuse F101	T 6.3 A
Fuse F102	T 10 A
Fuse F103	T 3.15 A
Fuse F104	T 3.15 A

Typical Power and Current

200 V, 50 Hz	1787 W, 9.0 A, PF 0.993
208 V, 60 Hz	1793 W, 8.7 A, PF 0.991
230 V, 50 Hz	1780 W, 7.8 A, PF 0.989
230 V, 60 Hz	1787 W, 7.9 A, PF 0.987
240 V, 50 Hz	1773 W, 7.5 A, PF 0.988

Measurements made at nominal voltage. Allow for a deviation of +/- 10%.

Thermal

Cooling	Filtered forced air (temperature-regulated)
Maximum ambient temperature (T_a)	40° C (104° F)
Maximum surface temperature, steady state, T_a = 40° C (104° F)	175° C (347° F)
Total heat dissipation (calculated, +/- 10% at 230 V, 50 Hz)	6120 BTU/hr.

Color Filters

Shape	Hexangular
Thickness	1.2 mm
Type	Dichroic

Approvals

EU safety	EN 60598-2-17
EU EMC	EN 55015, EN 55103-1, EN 61547
US safety	UL 1573
Canadian safety	CSA/CAN CSA E60598-1, E598-2-17

Included Items

Osram HTI 1500 W/D7/60 SharXS lamp (installed)	P/N 97010322
Front module with Fresnel lens (installed)	P/N 55203003
Front module with PC lens	P/N 55203006
Front module with super wide multi-array lens	P/N 55203012
30 mm aperture ring	P/N 23807480
40 mm aperture ring	P/N 23807460
45 mm aperture ring	P/N 23807470
Two Omega clamp attachment brackets with 1/4-turn fasteners	P/N 91602001
User manual	P/N 35000219

Accessories

MAC 2000 Wash Dimmer Wheel . . . . . P/N 62324018
Micro Fresnel lens (very narrow beam angle) . . . . . P/N 91610092
MAC 2000 Wash Barndoors . . . . . P/N 91611059
MAC 2000 Double Flight Case. . . . . P/N 91510017
Half-coupler clamp . . . . . P/N 91602005
G-clamp . . . . . P/N 91602003
Quick trigger clamp . . . . . P/N 91602007
Omega bracket. . . . . P/N 91602001
Safety wire, universal, 50 kg safe work load . . . . . P/N 91604003
DMX cable, STP, 1 pair + shield, IEC/UL-CL, 1 m . . . . . P/N 91611242
DMX cable, STP, 1 pair + shield, IEC/UL-CL, 2 m . . . . . P/N 91611243
DMX cable, STP, 1 pair + shield, IEC/UL-CL, 5 m . . . . . P/N 91611244
DMX cable, STP, 1 pair + shield, IEC/UL-CL, 10 m . . . . . P/N 91611245
DMX cable, STP, 1 pair + shield, IEC/UL-CL, 20 m . . . . . P/N 91611246
DMX termination plug, 3-pin male XLR . . . . . P/N 91613017
10 cm phase-reversing 3-pin male to 3-pin female XLR cable . . . . . P/N 11820006

Related Items

Martin DABS1™ USB-XLR interface device and cables . . . . . P/N 91611144
Martin Universal USB-DMX Interface Box™ . . . . . P/N 90702045

Spare Parts

Osram HTI 1500 W/D7/60 SharXS lamp . . . . . P/N 97010322
15 AT main fuse . . . . . P/N 05020039

Ordering Information

MAC 2000 Wash XB™ in 2-unit flight case . . . . . P/N 90204000
MAC 2000 Wash XB™ in cardboard packing case . . . . . P/N 90204015
MAC 2000 Wash XB™ Upgrade Kit (upgrades standard Wash to Wash XB) . . . . . P/N 91310980

Specifications subject to change without notice. See www.martin.com for latest product specifications.

Notes